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Hardness Testing on a Commercial Scale

The Various Testing Methods and Their Limitations —Results on Cast Iron Pistons and Steel Connecting Rods

BY E. F. LAKE*

DURING the past twenty years many machines have been invented and perfected for testing the hardness of materials. But it is still a question as to whether they are more or less valuable than the old fashioned file when testing metals on a commercial basis. Accuracy and reliability are the main requisites of any testing machine; but can we claim this for any of the hardness testers?

Probably the oldest method of testing the hardness of materials was to drop a hard steel ball of a given size or weight from a given height above the piece to be tested, and then to measure the distance of its rebound.

The scleroscope greatly improved this principle. A small portable instrument, doing the work more accurately than could the ball, with its cruder rigging, has been perfected. It drops a hammer of a given weight, with a ball-shaped point of a given diameter, from a given height. It then measures the rebound of this hammer on an arbitrary scale of its own. This scale is not comparable with the hardness factors of other hardness testers, unless it be through specially prepared tables that may err.

The sclerometer differs somewhat from the scleroscope, but uses the same principle of dropping a ball, or weight, on to the test piece. It also has an arbitrary scale of its own which does not give a hardness factor that compares with that of other hardness testing machines.

The Brinell machine was in use some years before the scleroscope and works on a different principle. It presses a hardened steel ball of a given size, with a given force or pressure, into the piece to be tested. By measuring the diameter of the indentation made by this ball, or its depth, the hardness factor is obtained. Thus, to obtain the hardness factor, or degree of

hardness, on this machine an arbitrary scale of its own must be used that does not compare with any of the other hardness testers.

The Rockwell direct reading hardness tester has been on the market only a short time, but has become well known. It is in reality a Brinell machine that uses levers, instead of the more common hydraulic pressure, to force the hardened steel ball into the piece being tested. It does not use air to operate the levers, as does the Olsen horizontal Brinell machine. It has added a dial that gives a direct reading of the hardness factor, and this does away with the microscope reading that must go with other Brinell machines. The point where the pointer stops on the dial indicates the depth of the indentation made by the ball. Therefore, to denote the degree of hardness,

a special scale of its own is also required on this machine. This does not compare with the hardness numeral given by other machines, unless it be the few that measure the depth of indentation made by the ball and use the same size of ball.

The auto-punch has a given weight, dropped a given distance, on to an ordinary center punch that rests on the test piece. A ball, or a ball-pointed punch, can be used under the weight, if more desirable. This also requires an arbitrary scale of its own which gives a different hardness numeral from other machines. When the ball is used, this becomes in reality a Brinell tester.

All Brinell machines give a different hardness numeral when the size of the ball is changed, or when the force or pressure is changed which causes the ball to indent the test piece.

The diamond-scratch machine places a given weight, or pressure, upon a diamond, which is drawn across the

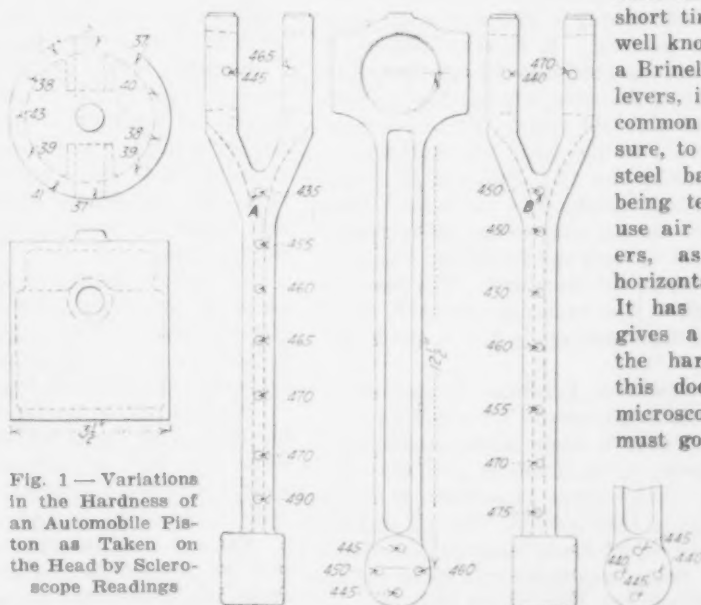
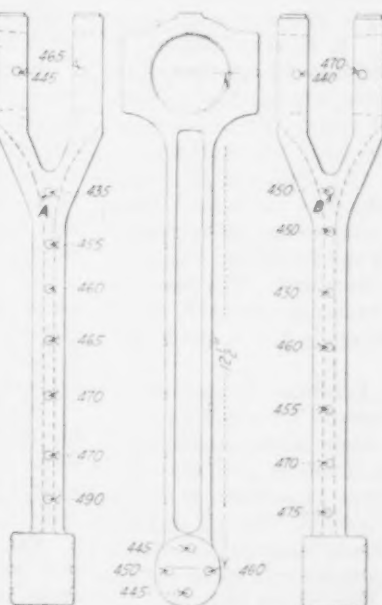


Fig. 1—Variations in the Hardness of an Automobile Piston as Taken on the Head by Scleroscope Readings

Fig. 2—The Various Hardness Numbers on Different Surfaces of a Double Connecting Rod as Taken by a Brinell Machine



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surface to be tested. A microscope is then used to measure the width of the scratch or cut. The depth of the scratch could be obtained for the hardness factor, but this would be more difficult and perhaps not as reliable. This also means that an arbitrary scale of its own must be used to express the hardness numeral, and this does not compare with the figure given by any of the other machines.

This machine has been varied by the use of a hardened steel cube in place of the diamond, for steels that have been tempered, or for materials softer than hard steel. One corner of the cube is used to cut, or scratch, the surface to be tested similar to the manner in which a diamond-point lathe tool starts a cut. This hard steel cube can be turned in its holder until all eight corners have been worn out.

The magnetic hardness tester can be ignored here, as it is not used to any extent on commercial work.

This enables us to divide hardness testers into three classes: Those that drop a ball or weight on the test piece and measure the rebound; those that force, or press, a ball or center punch, into the test piece and measure the width, or depth, of the indentation; and those that scratch or cut the surface of the test piece and measure the width, or depth, of the scratch, or cut.

Difficulties Encountered

With all of these and the different types of each there is a great deal of confusion as to hardness numerals because of each having a different scale from which to obtain this numeral. It is very difficult, if not impossible, to check one machine with another when we use two machines of the same type and more difficult when they are of different types. This is because we cannot operate twice on the same spot without deforming the test piece by the first operation in a way that will affect the result obtained by the second operation, even though we use the scleroscope. It is clearly obvious that we cannot operate the Brinell or diamond-scratch machines twice on the same spot. The sketches in Figs. 1, 2 and 3 show how variations occur in metal even when hardness tests are made but a short distance apart.

To get absolute uniform hardness throughout a piece of steel which is large enough for checking purposes is more difficult than it might seem, outside of a laboratory. Balls under $\frac{3}{4}$ -in. diameter that are used for ball bearings should be about as uniform in hardness as anything that is heat treated. Yet all makers of such balls have to reject many because they have soft spots in them. Sometimes these soft spots are no larger than a pin head, but they affect the wear of the ball. If one has to work on carbonized parts, this is all the more difficult, as soft spots of considerable size appear frequently, in spite of all that has been done to improve carbonizing methods and processes.

Then, again, hardness testing machines are not so perfect but that they sometimes give different readings on two successive operations performed on the test piece as near each other as will prevent the deformation of the metal of the first operation from influencing that of the second.

Hardness Versus Wear

Probably the greatest difficulty comes from testing for hardness when wearing properties are what are really wanted. This is especially so of gears, camshafts, pistons and numerous other moving parts of machinery. It is a well known fact that bronze gears outwear steel gears when running in mesh with them. Yet hardness testing would tell us that steel gears were the best.

Another example is Hadfield's manganese steel. When subjected to the severe grinding action of mineral dust, when used in stone crushers, gears made

from this manganese steel have worn three and four times as long as gears made from any other kinds of steel, no matter how they were hardened and tempered. Yet all of the above hardness testers would indicate that the common carbon steels were harder, hence better than manganese steel. Manganese steel is the toughest steel known, however, and it is this property of toughness that gives the greatest wearing quality.

Glass is admitted to be harder than any steel. Yet it can be cut and reduced to any desired size by filing, even though it be harder than a file. This is because hardness generates brittleness and the glass breaks up into fine particles and crumbles away under the action of the file. We do not want this brittle hardness, but toughness, in parts that are to resist wear or strains of any kind. It is a very difficult problem to show that metals have the proper degree of toughness with any kind of a hardness testing machine. It is probably impossible and something is needed that will reveal the degree of toughness in materials on a commercial basis.

Cast Iron Pistons

A concrete example of what hardness testers show was brought out by some cast iron pistons that we were testing for hardness to get their machinability before sending them to the machine shop. The specifications gave us a limit of from 35 to 39 on the scleroscope. Theoretically, pistons that were 40 hard would not machine easy enough to pay for the scrap loss. Even those that were 39 hard were given a special mark and kept by themselves as doubtful.

So many had to be scrapped under these limits that we sent some 40 hard to the machine shop without letting the workmen know the hardness. Not hearing any objections, we raised this to 41 hard; then we raised it to 42 and again to 43 hard. As none came back and we did not hear any complaints we were able to use up nearly all the pistons we had scrapped for hardness.

To find the degree of hardness, we polished a spot, about $\frac{5}{8}$ in. in diameter, near the outer edge of the piston's head, and hit this twice with the scleroscope. Sometimes one reading would be five points higher than the other, though but $\frac{1}{2}$ in. apart.

We resorted to the file for testing these pistons for hardness, and found we were able to satisfy the machine shop with machinable castings much better than we did with the scleroscope, without throwing too much scrap back on the foundry.

For our own information we polished several pistons all around the outer diameter of the head and tried the scleroscope in several places with varying results. A piston that is typical of this lot is shown in Fig. 1.

From the numerals, it will be seen that we could have accepted this piston on eight different readings if the scleroscope had happened to hit these places. If it had hit in three other places, however, we would have had to reject this same piston as being too hard; or those showing 40, 41 and 43 hard. The 43 seems rather high for a piston that reads 36 and 37 at the lowest place. But, such variations often occur in cast iron.

The density might vary more than the hardness. The scleroscope, Brinell machine or any other hardness tester would then show a greater variation between the high and low readings than would be given by the hardness of the piece. In commercial testing, we can never feel sure that it is hardness, and not density, that is affecting the results of the reading given by any type of hardness tester.

But the file will bite into the metal in exact proportion to its degree of hardness or softness. Of course files get dull and lose their biting qualities, and in this case a little skill or good judgment is required

of the file operator. Even with that weakness, it seems better than blind devotion to a hardness tester that might lead us astray. Density would not affect the file, unless it be after it reached an extreme approaching porosity. Even then a file would break away the metal in a brittle manner rather than in the smoothness of a cut into soft material. This seems to be another place where the human element is not easily replaced by a machine.

Double Connecting Rods

Another concrete example is that of the double connecting rod shown in Fig. 2. This is a fair sample of some 10 rods that we Brinelled all over in trying to find a solution for the many rods that were being rejected. Some of these were re-heat-treated three and four times before they came within the desired limits.

The rods were heat treated as they were received from the forge shop, before they were machined, to increase their strength and toughness and remove any strains that might have been set up by the forging operations. They were heated in a lead bath furnace to 1550 deg. Fahr. and quenched in oil. They were then tempered in a lead bath heated to 800 deg. Fahr.

There is probably no better medium than molten lead for heating a steel piece of this size to a uniform temperature throughout its entire length. The quenching oil was also kept cool by mechanical circulation. Therefore, we should get a uniform degree of hardness all over these connecting rods. We did not find much uniformity in hardness by the Brinell when we tested them all over with this type of machine.

The limits allowed for the acceptance or rejection of these rods were from 410 to 440. A spot was always polished at A or B for the Brinell test. Thus we could have accepted this rod if it was tested on the A side, but would have had to reject it as being 10 points too soft if tested on the B side. There was a difference of 15 points from the A to B side about $1\frac{1}{4}$ in. through the rod. Less than 2 in. along the stem there was a variation of 30 points on opposite sides or from 430 to 460. This would wipe out our tolerance of 30 points on such testing. We find a much greater difference, though not as close together, between the 410 on the crankshaft end of the stem, on the A side, and the 490 at the piston end of the stem; some $8\frac{1}{2}$ in. away. This 80 point variation seems unreasonable, but we found as great variations on other rods, and in two rods we found more difference than this. The flat of the bearing on the piston end gives a variation of 15 points between two places but $\frac{1}{4}$ in. apart. Through this piston bearing, opposite the 460, the reading was but 440, a difference of 20 points in a distance of $1\frac{1}{2}$ in.

Possible Causes

The most common conclusion to jump at in such cases is a condemnation of the steel, the steel maker and the forger, but these do not always prove to be the solution.

We might also argue that the bar from which such a forging is made must be distorted so much that the unequal strains would cause the steel to be more dense in some places than in others. If that were so, why should the greatest variations occur in the stem where the least distortion takes place? If we found them in the forked crankshaft end, such an argument would sound more reasonable, as there the bar must be deformed a great deal in order to form this fork.

Then, again, we might say the steel was heated to a temperature that was altogether too high when being forged. We know there is a great temptation for all forge men to heat steels to a temperature that approaches the burning point on account of the ease with which they forge at the higher temperatures. For that very reason, however, the forging temperatures are watched very closely, as a connecting rod is

too important a piece to be weakened by overheating in the forging operations.

Some of the causes for these variations might be found in any of the above guesses, or a combination of all of them might give the reason. Then, again, it might be that none were responsible, as hardness testers are not so perfect but what they might err.

Single Connecting Rods

In Fig. 3 is illustrated the single connecting rod that pairs with the double rod. It is a fair average of the 10 rods that we Brinelled all over. Between the crankshaft bearing and the piston bearing we find a difference of 50 points. Too much reliance cannot be placed on the figures shown on the crankshaft end. The Brinell machine pressure of 3000 kg. causes the metal to flow for some distance away from the ball. The ring of metal on the crankshaft end is so narrow that this pressure may have caused the steel to bulge

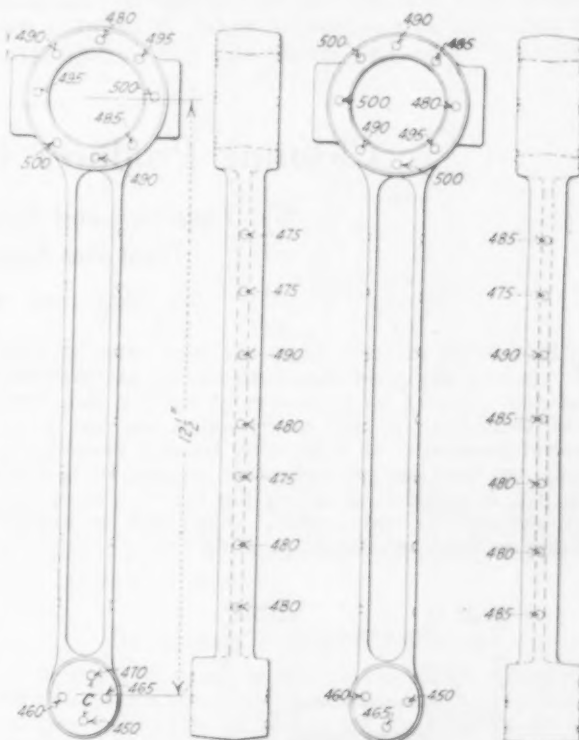


Fig. 3—A Single Connecting Rod, Showing the Variations in Numerous Hardness Values Taken with a Brinell Machine. This rod represents the one that pairs with the double connecting rod of Fig. 2

out on the sides of the ring rather than resist the ball as it should to get a correct reading. But there is a variation of 20 points at C, in a distance of 1 in. on the piston bearing end. In two places on the stem, there is also a variation of 15 points in a distance of $1\frac{1}{4}$ in. These seem altogether too much for steels that are accurately heat treated in lead baths.

Conclusions

That the Brinell machine was working perfectly on these tests, was shown by the fact that the pump lever was pulled down just five times to get the necessary pressure to raise the weights for every indentation made. The indicator also pointed to a pressure of 3000 kg. each time. We do not know of anything better than the Brinell method for making this kind of a test or inspection, but the above results would indicate that one cannot work within a range of 30 points when working on a commercial basis. Probably a 50-point limit would be as low as is practical on parts like connecting rods and 40 points on smaller parts or simpler shapes. A 30-point limit might work to advantage on parts machined from bars or those where the original bar is not altered much in shape.

Wear is not the important thing required of con-

necting rods, but enough strength is needed to withstand the strains it is subjected to in the engine. Tensile and vibrational tests show us that when we give these grades of steel the correct heat treatment, which means the correct degree of hardness, we can expect such rods to do their work without breaking or bending.

On a commercial scale, these methods of testing or inspecting every connecting rod are impossible, as it would be altogether too expensive to carry special test bars along with each rod. Therefore, we have to resort to the next best test, which is the one for hardness. If we allow too wide a range in the hardness figures, we get too wide a range in the strength of the metal. On the other hand, if we do not have a wide enough range we get too many rejections. At the very best, we cannot claim much accuracy in inspection methods when we have to resort to such a roundabout way of obtaining the strength of materials.

Ball bearing makers have not found any better method than eyesight for the testing or inspection of their balls on a commercial basis. It surprises the uninitiated to see how quickly girls will sort the balls

with soft spots no larger than a pin head, from those that are hard all over, by eyesight alone. All kinds of hardness testers have been used to check up these results and attempts have been made to displace the human element.

At the meeting of the Detroit Chapter of the American Society for Steel Treating, on Nov. 10, 1921, Mr. Freeland, of the Hoover Steel Ball Co., said: "In the hands of a skillful operator, we have found that a file will give us more accurate information as to exact hardness than we are capable of procuring with any other instrument we possess or could possibly secure." As balls have no flat surface, it would be extremely difficult to get a correct reading from the hardness testers now in use. The diamond-scratch machine would probably give more reliable results than any.

Hardness testing machines were a great step in advance, and they have a field of usefulness that is not approached by any other sort of testing device. But to use them where they give misleading results injures their reputation and everybody connected therewith.

Cleaning Producer Gas Without Washing

Gas Equalizer and Soot Collector Developed to Treat Gas from Bituminous Coal

BY JAMES H. MATHESON*

VERY little effective effort has been made to free the raw gas from dust, between the gas producer and the furnaces, and practically nothing has been done thoroughly to mix and equalize the gas from several producers. It is perfectly feasible, however, to clean raw producer gas and retain the sensible heat of the gas, in addition to saving the B.t.u. value of the tar and volatile hydrocarbon. This may be accomplished without additional operating cost.

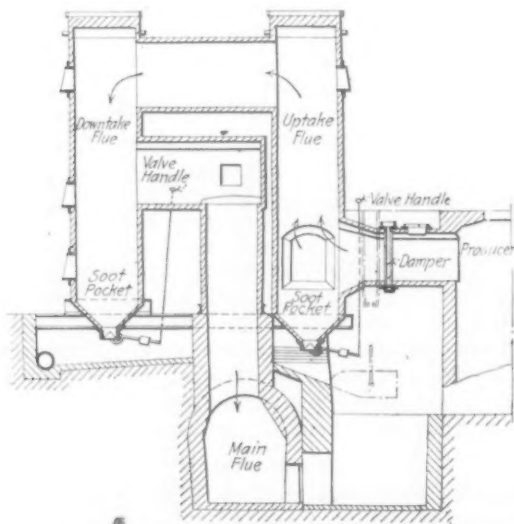


Fig. 1—Vertical Section Illustrating Gas Equalizer and Soot Collector and Showing Flow of Gas from Producer to Distributing Main

Referring to the drawings, the several passages leading from the producers communicate near the bottom to the uptake, as shown in Fig. 1. In each passage is a damper of the usual form, by which any one of the producers may be cut off temporarily from the soot collector. The downtake flue connects by means of a horizontal flue with the upper end of the uptake flue. From the downtake flue, gas flows across

to a second vertical flue leading to the main flue, shown in Fig. 1 below the ground level.

The lower portion of the uptake flue forms a soot pocket in which is a discharge opening closed by a valve actuated by rod as shown. The bottom of the flue is tapered toward this opening so that, when the valve is opened, the soot will flow readily into the inclined way and thence into the pit. A traveling bucket shown by dotted lines can be so located, when used, that the soot will flow directly into it. The lower end of the downtake flue forms a similar soot pocket.

Each side passage has a soot pocket with bottom

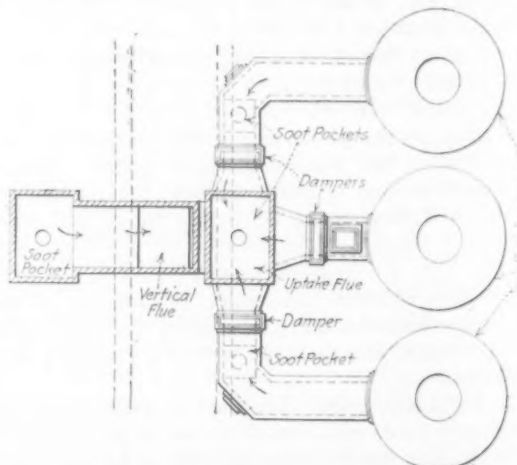


Fig. 2—Horizontal Section Above Producers and Plan of Layout of Producers and Gas Collecting Passages. This shows locations of dampers and of soot pockets

beveled toward the opening, which is closed by a hand-operated valve.

The uptake flue and downtake flues are rectangular in cross section, to provide broad and flat surfaces against which the gas impinges as it passes through them, thus more readily separating the soot and dust from the gas and thoroughly mixing the gas. When sufficient soot has collected in the pockets, the valves are opened so as to discharge the soot and dust from the pockets. By this construction the gas, when it

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reaches the main flue, is found comparatively free of soot, so that the cleaning of the main flue is obviated.

In Fig. 4 a modification is illustrated, in which the main flue is above the ground. Otherwise the construction is the same.

By constructing the soot collector in this manner, the gas of several producers is averaged and provides a uniform quality of gas at all times and, consequently, a much better quality of gas can be produced. For instance, when one producer of a series is making lean gas and another is making very rich gas, and the other

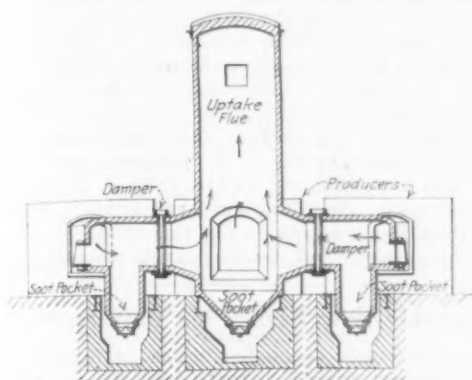


Fig. 3—Vertical Section through Uptake Flue, at Right Angles to First Section Shown

producers are making a medium gas, the gas from the several producers becomes thoroughly mixed while traveling through the various flues, so that when it reaches the main flue it will be uniform in quality.

Advantages of this installation include a saving of 20 to 25 per cent of the fuel, increased product, improved quality of product, saving in gas valves, less brick work and labor, less machine shop repairs, less labor in cleaning out soot at end of each week, more continuous operation of furnaces and more contented workmen.

In addition to the above, the dust recovered has considerable value, as it can be briquetted and burned under boilers or in furnaces, or it can be used for household purposes. The analysis of the soot and dust is as follows:

Sulphur	1.00 per cent
Moisture	0.77 per cent
Volatile combustible matter.....	0.18 per cent
Fixed carbon	78.71 per cent
Ash	17.34 per cent
B.t.u.	12,184

The soot and dust recovered from one stationary producer, 8 ft. inside diameter and 14 ft. high, equipped with a Chapman mechanical agitator, gasifying 1500 lb. of Westmoreland gas coal per hour, is approximately 4600 lb. per week of 5½ 24-hr. days, or in volume over 9 cu. yd. It is this soot and dust that made the furnaces and producers "sick." The Reading Iron Co. has cured this trouble by the above installation and, by a thorough mixing, prevented the existence of varying strata in the gas.

Particular attention is drawn to the small diameter of these producers, and to the large increase in gasification, after installing the Chapman agitators. By urging the producers, we can increase the gasification to 2000 lb. of coal per hour, but do not advise it constantly. We have found it possible, by the use of the gas equalizer and soot collector, to eliminate one producer out of every four.

The life of the furnaces will be very much prolonged, due to their steady working instead of frequent stopping and starting as formerly, to clean the mains, valves and checkerwork. The installation of the new equipment makes it possible to use a cheaper grade of coal. It will be noted by the illustrations that there is no complication, and the installation is not expensive. The application to a battery of three or more producers can be made very quickly.

The Reading Iron Co. is equipping all its producer gas plants with this arrangement. At the tube works,

in No. 1 gas house, there are now installed complete and in operation, two gas equalizers and soot collectors, each connected to a battery of three producers. In No. 2 gas house there has been installed one equipment, connected to a battery of four producers. In No. 3 gas house are two installations, each connected to a battery of four producers.

At the Ninth Street rolling mills has been installed one gas equalizer and soot collector, connected to a battery of five producers. The balance of the rolling mills are to be equipped as early as possible.

This equipment of twenty-three 8 ft. inside diam-

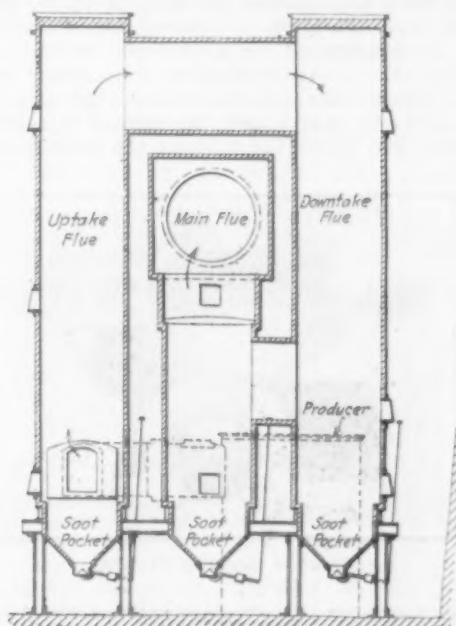


Fig. 4—Modification, with Main Above Ground Instead of Below the Surface

eter producers with Chapman agitators is supplying raw producer gas to sixteen large Siemens regenerative gas furnaces for lap-welded and butt-welded wrought iron pipe and to rolling mill heating furnaces and galvanizing plant.

Bridgeport Factories Gaining

In the week ended March 25, the metalworking industries of the Bridgeport industrial district showed a further slight gain in operations, as reported by 31 manufacturing companies to the Manufacturers' Association of Bridgeport. The percentage of employees engaged, as compared with a normal basis, was 55.7, while the percentage of man hours was 50.5. In man hours, this was an improvement of 1.3 per cent over the preceding week. The gain in the number of men employed is 3746 since the week of Jan. 7, when the low point this year was reached. The estimated normal number of employees for the 31 Bridgeport factories is 25,318.

Industrial Locomotives in Demand

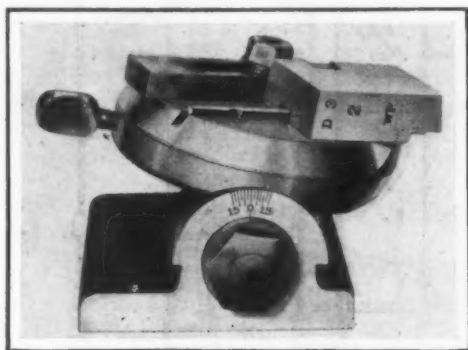
The American Locomotive Co., New York, has recently received an increasing number of orders for industrial locomotives. Among the companies which have bought one switching engine each are the American Brake Shoe & Foundry Co., St. Lawrence Brick Co., Castner, Curran & Bullitt, U. S. Gypsum Co., John B. Smith & Son, Ltd., of Canada.

Centrifugal castings are to be discussed at the spring meeting of the American Society of Mechanical Engineers at Atlanta, May 8, 9 and 10. The paper will be contributed by Leon Cammen, New York. The subject of welding will be made the topic of one session and papers are expected on the strength of mechanically welded pressure vessels, on forge weldings, this paper by F. N. Speller, metallurgical engineer, National Tube Co., and on tests of welded cylinders.

Fixture for Grinding Chamfer on Chasers

The Geometric Tool Co., New Haven, has placed on the market a fixture intended primarily for grinding chamfers on the Geometric milled form of chasers of the various standard types. It may be used, however, for the tapped form of chasers, in which case the grinding is straight and does not conform to the contour of the threads on the chasers, being correspondingly more pronounced the smaller the diameter which the chasers are to cut. The fixture permits the grinding of left-hand thread chasers as readily as right hand.

The table is graduated and may be set for grinding long or short chamfers. A narrow key at the top engages the keyway on the chaser and acts as a guide while grinding. An adjustable stop, which may be locked, governs the position of the chaser in respect to the grinding wheel, and the side of the fixture is graduated for tilting the table to the desired angle of



Chamfer Grinding Fixture

chamfer clearance. One fixture accommodates all sizes of chasers, but when used for the 5/16 in. size chasers it is necessary to remove the key at the top of the table and guide the chaser in the keyway.

When the fixture is bolted to the grinder table it is necessary to slide the chaser forward by hand to the wheel and against the stop provided on the fixture. On machines that permit, it may be fed forward, by means of the machine hand wheel or lever, to a stop arranged on the machine. Another method is to mount the fixture on the machine slide and grind the chasers by pressing them back and forth across the edge of the grinding wheel. Too small a wheel, however, must not be selected for grinding in this manner. The chaser should always be held firmly against the grinding fixture key while grinding, and clearance should be allowed between the stop and the side of the chaser.

Iron for Heating-Furnace Castings

In response to a request for information as to the proper iron analysis for withstanding the frequent alternate heating and cooling to which domestic heating furnaces are subjected, Y. A. Dyer, Birmingham, Ala., has suggested the following:

Percentage of	Heavy	Medium	Light
Silicon	1.75	2.00	2.25
Sulphur	0.08	0.06	0.06
Phosphorus	0.30	0.40	0.50
Manganese	0.90	0.70	0.60
Total Carbon.....	3.30	3.40	3.45

The Worcester, Mass., chapter American Society for Steel Treating held its initial banquet recently. Dr. John A. Mathews, president Crucible Steel Co. of America, and E. P. Gilligan, Hartford, Conn., president of the National Steel Treating Society, were among the speakers. Dr. Mathews gave an interesting talk on the history of the iron industry from the early ages to the present day, outlining inventions responsible for recent developments. Mr. Gilligan confined himself to the society's affairs. V. E. Hillman, retiring chairman, acted as toastmaster during the dinner. J. E. Rogers was elected chairman for the ensuing year, and W. A. Bacon, secretary-treasurer.

New Department of International Nickel Co.

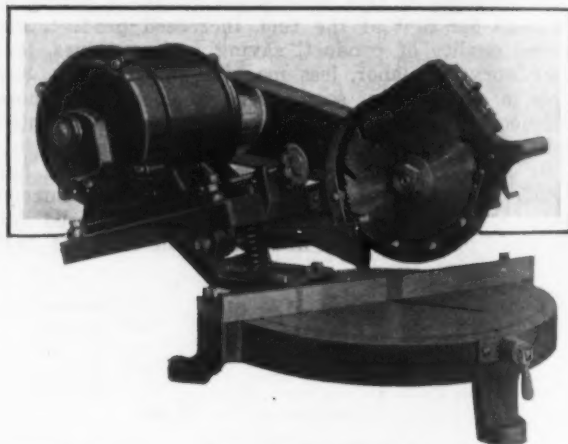
Robert C. Stanley, formerly first vice-president, was recently elected president of The International Nickel Co. Mr. Stanley has ordered a reorganization of personnel, involving as its chief feature a new department of development and research with headquarters at 67 Wall Street, New York.

The new department of the company is the outgrowth of a gradually maturing conviction that a study of its products and their successful use in the hands of the consumer is the key to the extension of tonnage distribution. Research departments at the mines, smelters and refineries of the company, established during the last few years, have now been crystallized into a headquarters organization in intimate touch both with its own plant developments and with outside engineering developments, touching on the use of nickel and monel metal in all fields. This department will be under the direction of A. J. Wadhams as manager. Associated with him will be Dr. Paul D. Merica, director of research. Mr. Wadhams has hitherto been manager of the Bayonne refinery of this company, in charge of the manufacture of the company's products.

Portable Saw Bench for Pattern Shops

A portable saw bench for use in pattern shops and packing rooms, taking current from an electric light socket and designed to swivel and cut any angle from 45 deg. left to 45 deg. right, has been placed on the market by the Tannewitz Works, Grand Rapids, Mich.

Both saw and motor are mounted on a tilting frame and belted together, as shown in the illustration. The frame in turn is mounted on a swiveling platform, a flexible spring serving to keep the saw raised when



Portable Saw Bench. The snap switch on the handle piece starts and stops the motor

not in use and furnishing the necessary resistance for accurate workmanship. The saw can be locked at any angle by means of the hand lever at the front. A stationary gage is provided at the axis of rotation and the saw hung so that all cuts are radial.

Other features include the motor adjusting screw which permits adjustment of belt tension and the dust spout which delivers dust to the rear. The machine is thoroughly provided with safeguards.

The Buckeye Land Co., subsidiary of the Youngstown Sheet & Tube Co., Youngstown, Ohio, handles through its office 630 properties which are rented or being sold to employees of the parent interest. If a worker purchases a home under the company's terms, he is given a separate, paid-up insurance policy, guaranteeing full payment of the balance of the account in case of his death or permanent disability from any cause.

Part of the premises occupied by the S. A. E. Steel Corporation, 207-209 A Street, South Boston, has been leased for a term of years to the Angell Nail & Chaplet Co., East Seventy-ninth Street, Cleveland, to be used as a distributing station.

By-Product Coke Tonnage Holds Up Well

Shows Enormous Advantage Over Beehive Fuel
in Year of Depression, Says United
States Geological Survey

BY R. S. MCBRIDE*

IT was shown conclusively in 1921, according to the United States Geological Survey, that by-product coking of bituminous coal is continuing to supersede beehive coking. This change in practice has been in progress for some years, but the first convincing demonstration that the by-product branch of the coking industry could maintain itself in a period of industrial depression more strongly than the beehive branch was made in 1921.

In 1921 the output of by-product coke was almost 20,000,000 tons, and that of beehive coke was about 5,500,000 tons, figures that show a striking contrast to those for 1920, when the output of by-product coke was more than 30,000,000 tons, and that of beehive coke was more than 20,000,000 tons.

The output of beehive coke in 1921 was less than that in any other year since 1885. One month of the year showed an output of only one-ninth the average monthly output in 1920. The monthly average for 1921 was only about 27 per cent of that for 1920.

The output of by-product coke in 1921 also showed a marked decline from that of 1920, though the output in the minimum month was more than half of that in the average month of the preceding year, and the output for the entire year was practically two-thirds that in 1920. This comparison of 1921 with 1920 becomes still more striking if we remember that 1920 was easily the "banner" year in the production of by-

product coke in 1920. The output of by-product coke in July was 52 per cent of the average monthly output in 1920, and the output of pig iron in that month was 30 per cent of the average in the preceding year. Thus it is evident that the decrease in the metallurgical demand for coke had the effect of greatly reducing the operation of beehive ovens, but that it caused only a relatively small decrease in the production of by-product coke.

Coke Output by States

Tables II and III are summaries of the production of beehive and of by-product coke in 1920 and 1921, by states or groups of states. These summaries show clearly that the decrease in production in 1921 was

Table II—Production of Beehive Coke, by Groups of States, in 1920 and 1921 (in Net Tons)

	1920*	1921†	Decrease	
			Tons	Per Cent
Pennsylvania and Ohio...	11,996,000	4,283,000	11,713,000	73
West Virginia	1,381,000	271,000	1,110,000	80
Alabama, Tennessee and Georgia	1,069,000	354,000	715,000	67
Virginia and Kentucky...	1,300,000	374,000	926,000	71
Colorado and N. Mexico.	512,000	119,000	393,000	77
Washington and Utah...	253,000	160,000	93,000	37
United States	20,511,000	5,561,000	14,950,000	73

*Final figures. †Estimate.

Table I—Estimated Monthly Production of Beehive and By-Product Coke and of Pig Iron in the United States in 1921

Month	Beehive Coke, Net Tons	By-product Coke, Net Tons	Pig Iron, Gross Tons*
Monthly average 1920	1,708,000	2,569,000	3,077,000
January, 1921	1,137,000	2,278,000	2,416,000
February	865,000	1,888,000	1,937,000
March	575,000	1,772,000	1,596,000
April	328,000	1,519,000	1,193,000
May	300,000	1,590,000	1,221,000
June	232,000	1,408,000	1,065,000
July	180,000	1,297,000	865,000
August	248,000	1,383,000	954,000
September	289,000	1,423,000	986,000
October	416,000	1,734,000	1,247,000
November	477,000	1,766,000	1,415,000
December	514,000	1,860,000	1,649,000
Total 1921	5,561,000	19,918,000	16,544,000

*Figures for 1920 from American Iron and Steel Institute; those for 1921 from THE IRON AGE.

product coke in the United States. In other words, despite the extraordinary slump in business, which greatly lowered the output of by-product coke, it was greater in 1921 than in any preceding year except 1917, 1918, 1919 and 1920.

Monthly Record of Coke Production

Table I shows the production, by months, of each type of coke, and the output of pig iron. The fluctuations in the output of coke evidently followed closely the fluctuations in the output of pig iron.

Table I shows that the lowest monthly output was made in July, when only 11 per cent as much beehive coke was produced as the average monthly output in

*United States Geological Survey, Washington, D. C.

Table III—By-Product Coke Produced in 1920 and 1921 by States, with Increase or Decrease in 1921 (in Net Tons)

State	1920		1921		Increase (+) or Decrease (—)	
	Ovens	Output, Tons	Ovens	Output, Tons	Tons	Per Cent
Alabama	1,081	3,122,890	1,101	2,406,000	—715,000	—23
Colorado	120	"	120	"	"	"
Illinois	794	2,136,793	894	1,326,000	—811,000	—38
Indiana	1,216	4,553,697	1,216	3,030,000	—1,524,000	—34
Kentucky	108	466,985	108	186,000	—281,000	—60
Maryland	300	682,132	360	293,000	—389,000	—57
Mass.	400	488,089	400	318,000	—170,000	—35
Michigan	389	1,393,445	389	778,000	—616,000	—44
Minnesota	220	674,801	220	431,000	—244,000	—36
Missouri	56	"	64	"	"	"
New Jersey	215	725,571	252	745,000	+19,000	+3
New York	732	1,040,192	732	815,000	—225,000	—22
Ohio	1,558	5,614,877	1,558	2,964,000	—2,651,000	—47
Penn.	3,006	7,730,256	3,154	5,439,000	—2,291,000	—30
Rhode Isl.	40	"	40	"	"	"
Tennessee	24	139,121	24	58,000	—81,000	—58
Wash.	20	26,284	20	21,000	—5,000	—19
West Va.	274	447,392	274	184,000	—263,000	—59
Wisconsin	228	"	238	"	"	"
Combined States	...	1,590,426	...	924,000	—666,000	—42
Total	10,881	30,833,951	11,164	19,918,000	—10,916,000	—35

*Included in "Combined States."

very generally distributed over the country, as there was an increase in the output of coke in only one state, New Jersey, where large plants that make by-product coke produce gas for municipal supply, and cannot therefore be operated only for the production and sale of metallurgical coke. The increase in that state, however, is not sufficient to be really significant.

Coke Ovens in Existence

Tables IV and V show the number of coke ovens in existence at the beginning of 1921 and their status.

No new beehive ovens were constructed in 1920, but more than 6700 were abandoned. At the end of that year about 75,000 beehive ovens whose daily capacity was almost 200,000 net tons of coke, were in existence, and 332 new ovens whose estimated additional daily capacity was 1800 tons of coke, were in course of construction.

The number of by-product ovens was increased in

Table IV—Status of Beehive Coke Ovens at the Beginning of 1921

State	Ovens Abandoned in 1920	Ovens in Existence, Jan. 1, 1921		Ovens Under Construction, Jan. 1, 1921	
		Number	Daily Capacity (Tons)	Number	Daily Capacity (Tons)
Alabama	253	8,482	13,571	...	...
Colorado	931	1,793	6,007	...	...
Georgia .....	...	151	242	...	...
Kansas	2	...	...	...	...
Kentucky	272	855	1,684	...	...
New Mexico .....	...	1,030	1,710	...	...
Ohio	50	222	444	...	...
Oklahoma .....	...	300	335	...	...
Pennsylvania	2,412	44,569	140,638	302	1,750
Tennessee	480	1,848	2,033	...	...
Utah .....	...	819	819	...	...
Virginia	135	3,906	7,270	30	60
Washington	25	407	545	...	...
West Virginia	2,146	10,916	20,767	...	...
Total	6,706	75,298	196,065	332	1,810

1920 by the completion of 757 ovens, whose daily capacity of coke was 11,170 net tons. During the year 300 old ovens were dismantled or abandoned, so that at the beginning of 1921 there remained in operation 10,881 ovens whose daily capacity was almost 120,000 tons of coke. Of the 396 ovens being built at the be-

Table V—Status of By-Product Coke Ovens at the Beginning of 1921

State	New		Ovens Abandoned in 1920	Ovens in Existence Jan. 1, 1921		Ovens Under Construction Jan. 1, 1921	
	Number	Daily Capacity		Number	Daily Capacity (Tons)	Number	Daily Capacity (Tons)
Alabama	247	4,707	90	1,081	11,665	90	777
Colorado .....	...	...	...	120	1,656	...	...
Illinois	80	1,600	...	794	9,347	100	1,500
Indiana .....	...	...	...	1,216	14,390	...	...
Kentucky .....	...	...	...	108	1,400	...	...
Maryland .....	...	...	...	300	4,200	...	...
Massachusetts .....	...	...	...	400	1,800	...	...
Michigan .....	...	...	...	389	4,660	...	...
Minnesota .....	...	...	...	220	1,952	...	...
Missouri .....	...	...	...	56	980	8	140
New Jersey .....	...	...	...	315	3,077	...	...
New York	210	2,454	70	732	7,822	...	...
Ohio .....	...	...	100	1,558	19,234	...	...
Pennsylvania	160	1,710	...	3,006	29,973	148	1,694
Rhode Island .....	...	...	...	40	456	...	...
Tennessee .....	...	...	...	24	252	...	...
Washington .....	...	...	...	20	70	...	...
West Virginia	60	699	...	274	2,028	...	...
Wisconsin .....	...	...	40	228	2,357	50	583
Total	757	11,170	300	10,881	117,319	396	4,694

ginning of the year, nearly all were completed before December 31, and at the end of the year only 85 ovens were under construction.

Types of By-Product Ovens in Use

Table VI summarizes, by types, the by-product ovens in operation at the beginning and at the end of 1921. This table shows a continued increase in the number of the two principal types of ovens built in the United States, the Koppers and the Semet-Solvay.

Table VII shows the location, character, and number

of ovens installed during the year. At the end of the year the Woodward Iron Co., at Woodward, Ala., and the Milwaukee Coke & Gas Co., at Milwaukee, Wis., were building 35 and 50 ovens, respectively, all of the Koppers type.

During the year 150 United-Otto and 40 Semet-Solvay ovens were abandoned.

Capacity of By-Product Ovens

Table VIII shows that the annual production of by-product ovens in operation on Jan. 1, 1922, would be

Table VI—By-Product Ovens in Use at Beginning and End of 1921 and Under Construction Jan. 1, 1922, by Types

Type	In Existence Jan. 1, 1921	In Existence Jan. 1, 1922	Under Construction Jan. 1, 1922
Koppers	6,036	6,303	85
Semet-Solvay	2,415	2,463	...
United-Otto	1,513	1,413	...
Rothberg	282	282	...
Wilputte	206	206	...
Cambria-Belgian	250	310	...
Gas Machinery	33	33	...
Klönne	42	42	...
Roberts	104	104	...
Plette .....	...	8	...
Total	10,881	11,164	85

44,275,000 net tons of coke if the ovens continued in operation without interruption 365 days in the year. As the average yield of coke for the industry amounts to 69.9 per cent of the coal used, this output repre-

Table VII—New By-Product Ovens Completed and Put in Operation in 1921

Operator and Location of Plant	Number and Type of Ovens
New plants:	
Chicago By-product Coke Co., Chicago..	100 Koppers
St. Louis Coke & Chemical Co., Granite City, Ill.	80 Roberts
Additions to existing plants:	
Woodward Iron Co., Woodward, Ala.	20 Koppers
Bethlehem Steel Co., Sparrows Point, Md.	60 Koppers
Laclede Gas Light Co., St. Louis.....	8 Plette
Camden Coke Co., Camden, N. J.	37 Koppers
Cambria Steel Co., Johnstown, Pa.	{ 88 Semet-Solvay 60 Cambria
Milwaukee Coke & Gas Co., Milwaukee, Wis.	50 Koppers
Total	503

sents a coal-carbonizing capacity of 63,340,000 net tons a year. However, operation at full capacity is impossible, even in periods of good demand for coke, and the figures for operation at 85 or 90 per cent of full capac-

Table VIII—Annual Capacity of By-Product Coke Ovens in Existence Jan. 1, 1922

	Coal for Charge (Net Tons)	Coke for Charge (Net Tons)
If operated at 100 per cent of capacity..	44,275,000	63,340,000
If operated at 90 per cent of capacity..	39,848,000	57,006,000
If operated at 85 per cent of capacity..	37,634,000	53,840,000

ity really represent a normal maximum for any considerable period. In other words, the by-product coke ovens, operable Jan. 1, 1922, can treat only about 55,000,000 net tons of coal a year.

The Morgan Construction Co., Worcester, announces that new mills designed and built for A. D. Whitehead, Newport, Eng., have been started. The mills are of the continuous type, having approximately 2000 tons of steel strip and hoops per week capacity.

Portable Saw Bench for Pattern-Shop Use

A small portable universal saw bench for pattern-shops, mill-wright work and for use also in the shipping department has been brought out by the Union Machine Co., Grand Rapids, Mich. It is designed to cut 2-in. stock.

Although the company's portable machines are usually offered without the base, using the base as shown, is recommended. A $\frac{1}{2}$ -hp. motor is employed and can be connected to a lamp socket. The table is an iron casting 18 by 20 in. and can be tilted and locked at any angle up to 45 deg. A graduated dial provided with a pointer serves to indicate the position of the table and a stop facilitates quick return to horizontal. The cross-cut gage can be used on either side of the saw, two slots being planed in the table, one on either side, for this purpose. This gage can



Portable Saw Bench for 2-In. Stock. The table can be tilted or locked at any angle up to 45 deg. When the handle is pulled forward a cam raises the feet from the floor

be set quickly at any angle and clamped. Holes are provided for mounting an auxiliary wood face piece. The ripping gage is machined on both sides and can also be used on either side of the saw. Tightening of the lever-head screw locks the gage in position and automatically lines up with the saw at the same time.

The saw is 7 in. in diameter, runs at 5000 r.p.m. and may be either of the ripping, cross cut or combination type. A guard is provided which sets down over the saw and can be instantly set to allow for thickness of stock cut. A splitter guard to keep the stock from pinching the saw is also provided.

The saw arbor is also mounted in ball bearings and the saw-arbor yoke is hinged so that it can be raised and lowered instantly, permitting the saw to project above the table high enough to cut stock from 2 in. down. Dado heads up to $\frac{1}{2}$ in. wide can be carried and should be 6 in. in diameter. Belt guards are

provided and belt tension maintained by means of a turn-buckle device. A metal throat plate, which is removable, permits replacement with a special hardwood throat plate for use with dado or grooving heads.

The motor switch is located at the front as shown. The base has two rollers at the back and two stationary feet at the front to give firm footing. When the handle is pulled forward for moving the machine a cam raises the feet from the floor, shifting the weight of the front of the machine on to a third roller which is carried on a swivel bearing, moving with the handle.

The height of the machine with base is 36 in. bench type, 10 in. The weights are 268 lb. and 133 lb. respectively for base and bench machines.

February Output of Automobiles

According to *Automotive Industries*, the February production of automobiles in the United States amounted to 129,500 cars, compared with 90,486 in January, 78,995 in December and 116,349 in November. A much larger proportion of these were shipped from factory by railroad than in the previous year.

Drill and Tap Crib with Gage Feature

A drill and tap crib and gage, the general construction of which is indicated in the accompanying illustration, has been placed on the market by the Victor R. Lawson Co., Boston. It is a drill crib with a drill gage built into the body.

The container is 41 in. by 9 $\frac{1}{4}$ in., and has 60 semi-circular pockets 1 $\frac{1}{4}$ in. wide, as shown. The lower row of pockets is 4 $\frac{1}{2}$ in. long; they are intended for drills Nos. 1 to 30, the upper row being 2 $\frac{15}{16}$ in. long, for drills Nos. 31 to 60. This arrangement permits seeing at a glance the number of drills in stock.

The drill gage holes, located at the end of the pockets, are of hardened steel strips, 1/16 in. thick by 5/16 in. wide. The gage is dove-tailed and pinch-clamped in a strip of maple 1 by $\frac{1}{4}$ in., upon which are printed the numbers from 1 to 60 and their decimal equivalents. The numbers are of $\frac{1}{4}$ in. figures, readable from a distance of 8 ft.

The taps are positioned perpendicularly in holes located in the strip dividing the upper and lower compartments, the holes being intended to hold three taps of each size from 14-20 to 4-36. Each set is adjacent to the correct drills for drilling either a full, three-quarter or a half-threaded hole. A red line extending along the dividing strip indicates the largest and smallest size of drill that could be used, the drills within the scope of the red line being correct for a half to a full thread. This graphic arrangement is intended to eliminate the necessity of referring to tables or formulae.

To prevent returning a used tap to any but the hole allotted to it, the holes are drilled so that taps larger will not enter and those smaller will fall through. When the workman picks up one of the taps he has at his fingers' ends the correct drills for tapping, and also the gage with which to test and check them. Further, he is warned of the limits by the indicator line as set forth and, aside from its use as a tap and drill container, the device serves as a ready reference table. It is marketed under the name of One Glance.



The Lower Row of Pockets Is for Drills Nos. 1 to 30; the Upper Row for Nos. 31 to 60. The drill gage hole is at end of pockets, as shown. The taps are placed perpendicularly in holes in the dividing strip between the rows of pockets

Better Lighting an Economy Measure

Gain in Shop Production Much Greater Than Increased
Lighting Cost—Greatest Improvement on
Most Exacting Work

BY WARD HARRISON*

THERE is hardly an industrial plant in this country which has not in the past year given careful consideration to the subject of more efficient and economical operation. The keen competition now existing, particularly in all the metal-working industries, requires the utilization of every possible economy measure. Good artificial lighting is one of these measures, although this fact is not yet so widely appreciated as its importance merits. In a test recently conducted to determine the actual dollars and cents value of improved illumination, it was found that, as a result of the installation of a modern system of illumination, production was increased 12.2 per cent, while the increase in the lighting costs amounted to only about 2.55 per cent of the payroll.

This investigation was made by the Dover Mfg. Co., Dover, Ohio, in conjunction with the engineering department of the National Lamp Works, Cleveland. The plant makes an extensive assortment of electric, gas and ordinary sadirons for home and laundry use. The investigation was conducted in the press department, a rectangular area approximately 29 ft. x 112 ft., which is equipped with five punch presses, two milling machines, eight drill presses, one tapping machine and one tool grinder.

The chief operations performed on the punch presses consist of blanking, forming, shearing, reforming and punching hoods for the irons, while the work performed on the drill presses consists of drilling and tapping the iron castings. The milling operations consist of surfacing the bottoms of the irons. At the time the investigation was begun the personnel of the de-

partment consisted of fourteen men—a foreman, ten machine operators and three helpers. The press department has no skylight and is partitioned off from other parts of the plant in such a manner that there are no windows having an outside exposure, even on a court, and therefore virtually no daylight reaches the department, the average daylight illumination at noon on a sunny day being less than 0.1 foot-candle.

Originally the lighting system consisted of 32 outlets, 22 of which were equipped with 50-watt lamps used for local lighting, one with a 100-watt lamp, also for local lighting, and nine with 100-watt lamps for general illumination, only two of the latter, however, having reflectors. The lamps for local lighting were fitted with wire guards and, in a few cases, also with home-made tin glare shields. The average illumination on the working plane throughout the room was about 0.7 foot-candle, and the illumination supplied at the tool points varied between 0.3 and 12 foot-candles, the average being about 4 foot-candles.

As originally planned, the investigation called for a comparative test with the old system and with a general overhead lighting system consisting of 27 "RIM" standard-dome reflectors and bowl-enameled lamps. It was also planned to vary the levels of illumination with the new system, noting the production under each level and checking back at intervals to the old system. However, a partial shutdown of the plant very much curtailed the scope of the investigation, and this latter idea was reluctantly abandoned. The data secured, therefore, simply indicate an answer to the first question, namely, the comparison of production under the old or original system with the average production results as found under the new system,

*National Lamp Works of General Electric Co., Cleveland.



Original Lighting, Full of Shadows and Pitfalls, Concentrated in a Few Spots



Present Lighting, Producing Better Work, and More of It, at Moderate Added Cost

which afforded an average illumination over the test period of $13\frac{1}{2}$ foot-candles. With the largest lamps

Production Data for Period of Investigation

Factory Operation Number	Factory Operation	Pieces per Hour		Change in Pro- duction, Per Cent	Hr. per Operation
		Old	New		
1-32	Drilling	133	164	23	49½
1-33	Tapping	293	258	-12	22
6-G-11	Milling	54	60	11	57½
6-G-11½	Spotting	188	222	18	14½
6-G-42½	Punching	42	130	210	20
6-G-43	Drilling	59	52	-12	27
6-G-44	Tapping	82	108	32	16
62-3	Drilling	420	519	24	31½
62-4	Tapping	490	609	24	34
72-3	Drilling	255	255	..	194½
622-4	Drilling	535	464	-13	130½
901-5	Blanking	1,517	1,652	9	48
911-1	Blanking	916	1,034	13	48
911-2	Shearing	1,074	1,800	68	33
921-1-2	Blanking	349	962	13	43½
921-4	Reforming	1,043	1,534	47	28½
921-5	Punching	1,125	1,296	15	25
922-4	Tapping	447	399	-11	38½
C-97	Blanking	1,495	1,517	1	10
.....	Plugging	90	98	9	118½

in the test, illumination was approximately 22 foot-candles.

It was found that 98 distinct operations were performed in the press department while the investigation was in progress. However, there were a great many minor operations, so far as the test was concerned—that is, operations which were not carried on for more than three or four hours under each of the two systems of lighting. Eliminating these, there remained twenty operations from which definite conclusions were warranted as to production changes under the original and new systems of illumination.

Of the twenty operations, fifteen showed increases in production, four indicated decreased production and one showed no change. The operation which showed neither loss nor gain was one which required no special discrimination of details. It consisted merely of picking up an iron, laying it in a jig, pulling a lever for drilling, and then removing the iron. Operation No. 6-G-42½, which showed an increase in production of 210 per cent, required very close discrimination. It

consisted of accurately locating the center of an iron casting with dividers and then center-punching for drilling.

The four individual operations for which decreases in production were indicated come under the head of drilling or of tapping operations. It will be noted in the table that in each of these two groups there are several operations carrying separate numbers and listed separately. For example, there is one operation number for drilling a hole in a certain part and another operation number for a different size of hole or for a hole in a different size of iron. As a matter of fact, if all drilling operations are placed in one group and likewise all tapping operations in one group, it will be found that in each case the gains in production more than offset the apparent losses.

In other words, the precision with which the data could be recorded (to the nearest half hour) and the variation in the quantity of the material worked upon were such that it is dangerous to place too much weight on the exact percentage of gain or loss indicated for any one operation. When all of the figures are averaged to obtain the production of the shop as a whole, many possible sources of error, such as those due to recording time and to variations in material, have a tendency to average out.

To determine the percentage increase in efficiency of the shop as a whole, it was necessary to weigh each operation in proportion to the total number of hours devoted to it. It was considered that the relative shop importance of any one operation was simply the ratio of the number of hours spent on the operation during the investigation to the total number of hours spent on the twenty operations tested. It is readily seen that the short-time operations thus have very little weight, whereas the operations which were worked upon for a long duration are given greater weight. The results of the investigation, with the operations weighted as described above, indicate that, at an increased expenditure for lighting of approximately 2.55 per cent of the payroll, production in the press department was increased 12.2 per cent.*

There were several operations on which sufficiently accurate data were not obtained to warrant tabulation in this summary, but which also showed increased economy in operation. For instance, under the original

lighting system it was necessary to drill and tap two pieces used in making the electric iron, load them on trucks, assemble them in an area where there was daylight, and then carry them back into the shop for further tapping. Under the new system of illumination it is possible to assemble the pieces right at the machines. Again, it had been the custom to have several men work on Saturday afternoons to clean up the shop. After the new system was installed it was found that, as the department was kept in a more orderly condition during the week, it was possible to dispense with Saturday afternoon work. This saving alone was sufficient to defray a large part of the lighting cost.

One operator stated that the drop cords they had previously been using interfered with his movements about the machine; another that, although he believed he would not produce more work under the new system, the work he would produce would be of better grade. A helper who cleaned up the steel scrap from

the punch presses remarked that the new system offered safety protection, in that he could now see the sharp, ragged edges of the scrap. Some of the other comments made by the men in regard to the increase in illumination were: "Room appears to be larger";

*Cost of energy, 4c. per kwh.

Cost of old lighting system per year.....	\$250
Cost of new lighting system per year.....	500
Increased expenditure for lighting.....	510
Payroll per year.....	20,000

"More pleasant to work under the increased illumination"; "It will be impossible to do very much stalling on the job in the future." The company officials were so impressed with the new lighting that they have purchased the equipment used in the investigation. At their request a complete illumination design was made for the entire plant, and parts of this new system are already installed.

WELDING SOCIETY MEETS

Electric Resistance Welding Discussed—Various Applications of Thomson Process Outlined

Electric resistance welding was the subject of a talk by R. S. Donald, Thomson Electric Welding Co., 50 Church Street, New York, at a meeting of the Metropolitan section of the American Welding Society, held in the rooms of the society, March 21. It was explained by the chairman, A. G. Oehler, *Railway Electrical Engineer*, that the selection of the subject was caused by a discussion developed at a previous meeting from a statement that the spot welding of 30-lb. pressure tanks was not successful commercially. In answer to this Mr. Donald said that the spot welding of high or low pressure tanks is impractical inasmuch as a welded seam cannot be calked and eventually will pull apart.

After a brief outline of the development of the Thomson process of electrical resistance welding, Mr. Donald showed samples of various welds, meanwhile giving details as to machines and processes, answering questions during the course of his talk. He took up in detail the welding of high-speed steel showing samples of what is being done on a commercial scale by several companies, the samples including planer tools, lathe centers and the liners used in automobile steering mechanism. As an example of the success of this method he cited a prominent lathe builder who used this method exclusively, and out of a run of 20,000 centers had only 7 rejected due to poor welding. The important thing in welding high-speed steel, he said, is to heat treat at once, before it cools. The material is taken from the welder to the furnace, brought up to 1600 deg. Fahr. and then cooled in the furnace or in lime. This has an annealing effect, equalizing the strain and eliminating the chill line.

Asked as to the practicability of welding longitudinal seams in tubing, Mr. Donald said that it is being done commercially and gave an instance in the metal-bed industry, where production is at the rate of 70 ft. per min.

An interesting example of contact flash welding was shown in the welded halves of a pressed steel float 1½ in. long by 1¼ in. outside diameter, used in connection with a special valve. For this a special automatic machine is employed having a pressure of 2 tons and taking 9000 to 10,000 amperes at 4 volts. The production was said to be 1 per sec. The flash-weld method can be used where an ordinary upset weld is not successful, Mr. Donald said, and will increase production 100 per cent and reduce the percentage of poor welds.

As proof of the strength of Thomson process welds a metal-cutting band saw was exhibited which under test broke 8 in. from the weld. Samples were shown also of a ½-in. U-form piece which was tested for tensile strength, the eyebolts of the testing machine breaking at 20,580 lb. and preventing completion of the test.

Steel can be welded to cast iron, he said, but requires a very good grade of iron. An example was given in valve stems welded to the heads which stood 15,000 lb. per sq. in. although only 4000 lb. was required.

Stainless steel may be welded successfully, said Mr. Donald, although many operators have failed. The trouble is, he said, that stainless steel has greater resistance and should have shorter projection in the machine, in order that the resistance be equalized. This steel should be flash welded he said, in order to assure the very best results.

The welding of brass to steel requires a machine with a special pressure device but is being done commercially, he said, and in successful copper welding he cited the case of a company welding the short ends of billets which are subsequently drawn down to form wire.

Mr. Donald pointed out that in spot welding a majority of the operators fail to clean the stock, the effect of dirt and oxide being the same as in the case of an ordinary blacksmith's weld. Among other reversals of proper spot welding practice, he mentioned that in welding heavy material to light, many operators use a large die on the light material. The correct method, he emphasized, would be to put a large electrode on the heavy material and small point on the light material, using the heavy material itself as an electrode. This creates the greatest resistance at the poor contact between the sheets, causing it to heat at the proper point, giving a good weld.

Operating Under Contract

The locomotive department of the Big Four shops at Beech Grove, a suburb of Indianapolis, which had been closed since Feb. 15, has reopened under the contract plan by the Railway Service & Supply Corporation, which is also operating three other departments in the shops on the contract basis. About 900 men will be on the payroll. E. S. Pearce, general manager of the corporation, says the success with which it had operated three other departments led to the addition of the locomotive shop to the contract. Under the system, the work in the locomotive department is sublet to individual contractors. The contract system, Mr. Pearce says, speeds up production and enables the men to make more than under the old 77c. per hr. basis. They work nine hours a day with a Saturday half-holiday. The corporation is studying the passenger coach department with the purpose of submitting bids for operating it under contract.

The Greenfield Tap & Die Corporation, Greenfield, Mass., has compiled a five letter code for the use of its customers. Although originally published for foreign buyers, the company is recommending it for use by domestic purchasers. The code is so arranged as to permit of combination with the majority of standard codes in use.

Steel Casting Plant Has Liaison Service

How Detroit Steel Casting Co. Co-operates with Its Customers
in Designing Parts for Effective Production
and Decrease of Waste

BY G. P. BLACKISTON

STEEL castings were first made in 1867, but not until about 30 years ago were they produced on a commercial production basis. Twenty years ago the Detroit Steel Casting Co. had a small converter shop with a single Roberts converter. Struggling with its problems, even early in its history the company became impressed with the fact that its solution was to be found in the plants of the users of the castings. After careful analytical study the inevitable conclusion was reached that the pressure of economic conditions would render it necessary for those industries which were to survive to find some means to eliminate waste in production.

Reviewing the situation, after many years of contact with actual conditions, both in the plant where the castings are made into parts of finished machines and in the steel foundry itself, it can now be said that the greatest obstacle that had to be overcome was the lack of a sufficiently close relationship between the engineers who design and specify the dimensions and contours of the various parts and the foundrymen who actually produce them. Consequently, this company adopted

the policy of maintaining expert foundrymen for the single purpose of connecting the shop where the castings are machined with the foundry where they are made. By this method it was found practical to iron out thoroughly between the foundry and the machine manufacturer those finer engineering points, with the natural result that fewer parts were scrapped due to defects of the castings.

With the passing of time, the foundry found it necessary to install additional open-hearth furnaces and converters. These new additions were so arranged that this foundry may now be considered as two separate shops—one an open-hearth plant used primarily for the production of fairly heavy castings and the other a converter unit used to produce small steel castings.

While the real flesh and blood contact between manufacturer and foundryman is an overshadowing feature of the operating policy of the company, yet there are many developments, in the foundry itself, that facilitate the production of better steel castings on an economical and efficient basis.

One core room is provided for both the open-hearth and converter units. The dry sand molds are made in the open-hearth shop and dried in the ovens. The converter work is practically all done in green sand. As originally constructed, the core ovens were operated on the coke-fired forced-draft principle, the entire battery being heated by one firing system.

When the country went to war, the demand for

truck and other castings became so great as to necessitate organizing the core room to produce maximum output. Three small rack-type ovens were installed, occupying a space of only half that of the former equipment, and for many months in succession baked an average of 32 cars of cores every 24 hr. The core room is covered with a traveling crane, and the core racks are placed between the coremakers' benches, the coremakers placing the cores directly on the racks. The crane then picks up the rack and places it on the cars running in front of the ovens. The car is run into the oven, the cores baked, the car run out and the rack of baked cores transferred by the crane to the core storage department. In some cases it is handled

by a transfer car and sent directly to the molders' floor.

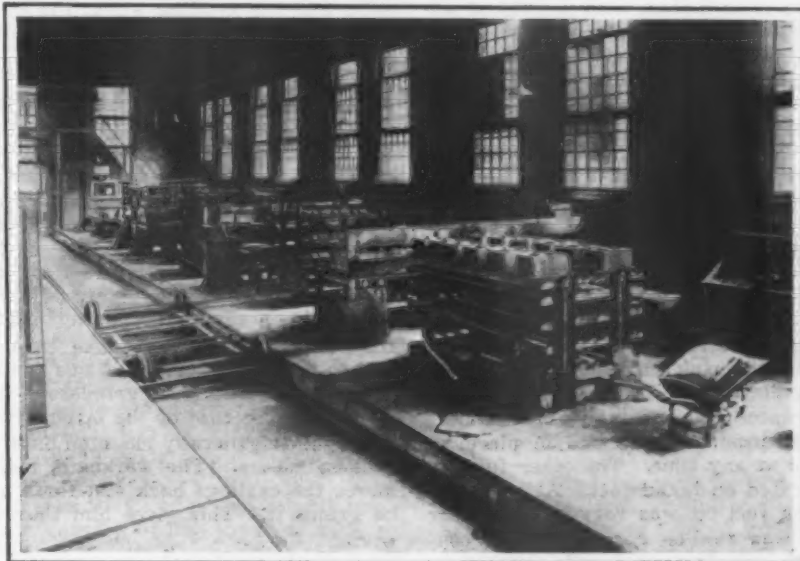
After these ovens had been in use for several years they were equipped with a specially designed stoker for burning soft coal, manufactured by the Hare Stoker & Furnace Co., Detroit. The change from coke to stoker firing resulted in drying the cores with fewer pounds of fuel than formerly, and with a fuel which costs less than half as much per ton. It also eliminated a

large proportion of the labor of firing the ovens, as the stoker has an automatic cleaning feature.

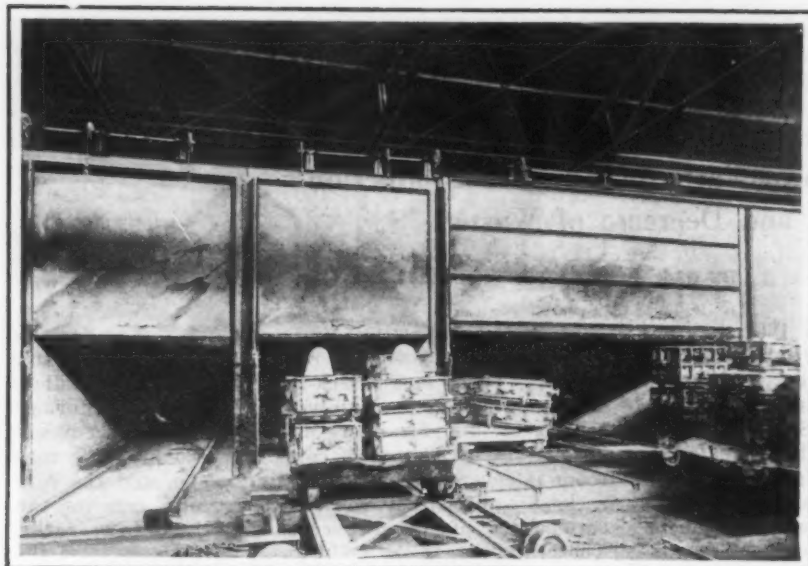
Particular attention is called to the type of core makers' benches. Between each two rows of benches is a narrow sand alley; a man wheels the sand in behind the benches and delivers it to the coremakers without interfering with their work. This room with its present arrangement has proved a splendid unit for intensive production.

The dry sand mold department has one wide oven and two narrow ovens. The wide oven on the right has two parallel tracks and takes either two trains of narrow cars or cars bound together by a special device, to carry large molds. The narrow mold oven at the left is made deeper than the others, so that it may handle locomotive frames.

These ovens are all fired from two fireboxes in the pit under the cleaning room floor back of the mold ovens. This is a forced draft type pit, the air coming down through a pipe in the upper right-hand corner of the ceiling, the auxiliary air entering the walls about the furnaces through small square openings in the brick wall at the right and left of the ovens. Air for combustion, passing in through the ashpit door, is controlled by blocking the door open to any desired degree. This style of forced draft auxiliary air firepit is practically the same as was used on the core ovens before the stoker was installed, and it is the intention now to replace these fireboxes with stokers at some time in the future. The present installation, however,



Core Room Layout, Showing Transfer Car Which Takes Filled Core Racks into the Core Oven and Brings Back Empties



Three Ovens of the Dry Sand Mold Department. The one at right can take wide molds, spread across two cars

has been in use for a number of years, and the construction of the boxes is such that, with the aid of the cooling system, a very long life to the brick work, as well as a great fuel economy in the oven, results.

The converter department is an independent unit in all respects. It has its own annealing oven and its own cleaning department, and this tends to keep the two classes of castings separate. The cleaning department adjoins the side of the No. 2 shop.

Melting in the open-hearth department is done in two 20-ton furnaces built by Holcroft & Co. The furnaces originally installed at the plant were lower, and when two furnaces were repaired the charging platform was raised above the molding floor line. A charging machine was installed, and a handling scheme for handling the scrap in the yard, making up the charges and delivering carloads of charging boxes to the charging platform.

One of these furnaces was originally operated by producer gas, and the producers are still in place, so that they can be used at any time. The other furnace has always been operated on liquid fuel. At one time, some years ago, when fuel oil was very high and tar cheap, this furnace was run on coal tar for a considerable period, with satisfactory results, but oil is simpler to handle, and often the market is such that tar cannot be obtained so as to compete with the oil. At present the melting is being done with oil.

The main bay of the foundry has a number of traveling cranes, to handle any size casting which

comes within the limits of their pouring ability.

A method of skidding molds is commonly used in this plant. Two pieces of railroad iron are clamped together with suitable spacers and provided with links at the ends. Upon these are piled the molds as they come from the molding machine. The entire skid is then taken to the pouring floor. After pouring, the skid of molds is taken to the shake-out floor, and later the skid with the empty flasks and bottom boards on it is returned to a position near the molding machine.

Large castings are cleaned under the main cranes in the open-hearth shop, and a large annealing oven is located under this crane, where they can be annealed. Smaller open-hearth castings are cleaned in either of two cleaning departments. One, which is devoted mostly to railroad work, is

located in the same side bay that contains the core room and the molding units; the other, devoted mostly to jobbing castings, is in the opposite side bay adjoining the dry sand oven.

Castings from these two departments are shipped at the end of the building. Practically all small castings that are to be shipped in carload lots are cleaned in the bay adjoining the melting unit, and provision is made for switching a car into this department under the crane. Provision is also made for shifting a car into the main bay of the open-hearth shop and loading heavy castings. The product of the other cleaning room is practically all trucked to local customers.

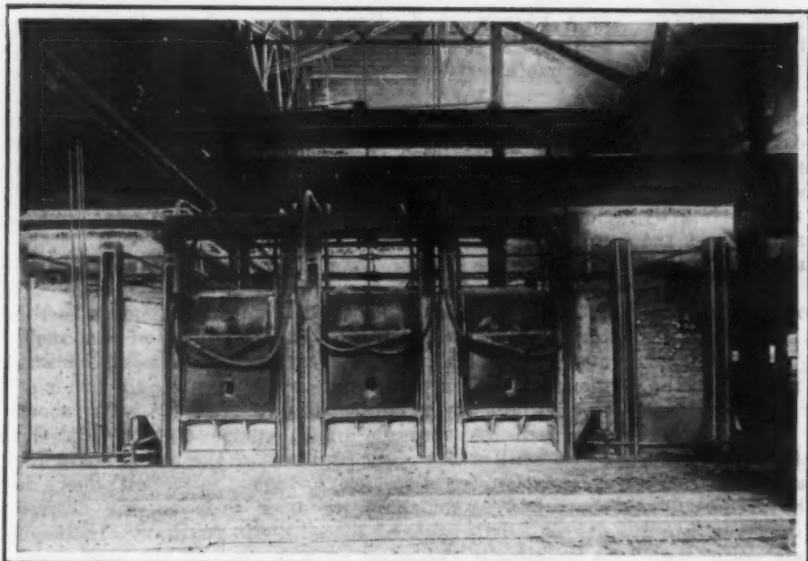
At the end of the plant, adjoining the annealing furnace, is a sand conveyor pit and refuse hoppers on the outside arranged to take care of outgoing sand, and to recover a portion of this for reuse in the plant.

There are a series of grinders in the cleaning departments. In the case of the large swinging grinders the castings are generally mounted on a wooden frame carried on rollers. The workman, riding on this frame, moves the castings back and forth under the wheel as he grinds it. This gives him thorough control of his work.

One illustration shows a portion of the battery of saws and other tools used for cutting off heads and risers, in one of the cleaning rooms. Attention is called to the charging box in the foreground. These boxes are placed at intervals through the cleaning department, and all heads and smaller waste material thrown into them, care being taken to see that each grade of material is kept by itself. The boxes are then transferred by crane to a car at the end of the shop, and thence to the metal department adjoining the open-hearth building.

The pattern shop and main pattern vault are located in a separate building adjoining the converter shop, and yet at the same time in such a position that these patterns are readily accessible to the molders on either of the molding floors. An auxiliary pattern storage for outside patterns and patterns that are rarely used is located at the opposite end of the plant.

For the storage of fuel oil a double reinforced concrete tank has been installed near the track entrance to the yard. This tank, which holds 140,000 gallons of oil, is designed to carry 10 to 12 ft. of coal piled on top of it. The stor-



One of the Two 20-Ton Open-Hearth Furnaces for Melting the Steel. This is run normally on liquid fuel

age tank is filled directly from rail-road tank cars spotted alongside proper precautions being taken to prevent both ignition and freezing or sluggishness as the oil is transferred.

Rates from Chicago to Southern Points Approved

WASHINGTON, April 4.—The Interstate Commerce Commission last week handed down a decision holding that proposed proportional rates, representing reductions, from Chicago and related points to South Atlantic and Gulf ports for application on traffic destined to the Pacific Coast by steamship lines operating through the Panama Canal are justified. As a result it issued an order vacating the suspension of these rates. The lowered rates were urged by commercial interests of Chicago and the Middle West generally, steamship lines operating through the Panama Canal and Southern railroads from Chicago and points usually taking the same rates to the South Atlantic and Gulf ports. The rates proposed are the same as the local rates from Chicago to New York which are applied on traffic destined beyond by water. The reductions also call for maximum and minimum proportional rates from intermediate points south of Chicago. Rates differentially higher are proposed from a few points such as Madison, Wis. The present local rates, wherever they are lower than the proposed proportionals, will remain applicable on the traffic involved.

The primary purpose of reductions is to put the South Atlantic and Gulf ports on a parity with New York on traffic destined to the Pacific Coast and to thus afford the Southern lines an opportunity to secure some of the traffic now moving to the Pacific Coast all rail or through North Atlantic ports by rail and water. In many cases the steamship rates are lower from South Atlantic and Gulf ports than from New York and the resulting through rates would be lower than via New York.

The commission says that the record established is that it would require much more than equality of through rates to induce a large movement of the traffic through South Atlantic and Gulf ports. In this connection it is pointed out that the distance by water to San Francisco from New York is about 660 miles greater than from New Orleans, the distance from New York being about 6060 miles as against 5400 miles from New Orleans, but North Atlantic ports offer much more attractive service. Transcontinental rail lines oppose the proposed rates because they would in so few cases result in lower through rates from Chicago than those now available and would thus tend to draw through South Atlantic and Gulf ports some of the traffic which the transcontinental lines might otherwise handle.

The Norton Co., Worcester, Mass., grinding machinery and abrasives, has organized a third division, the safety tile, in charge of Herbert K. Dodge, for 18 years New York district manager for the company. Howard E. Smith, formerly sales manager Concrete Steel Co., New York, and Willard Van Ness, New York, will be in charge of the sales promotion in the West and East, respectively. H. O. Richter, Worcester, will be office assistant to Mr. Dodge.



General View of the Detroit Foundry Giving a Good Idea of the Character of the Work Handled. Grinding wheels in background

Amalgamated Association in Detroit

The annual convention of the Amalgamated Association of Iron, Steel and Tin Workers will be held in Detroit this year, beginning the second Tuesday in May. Delegates are elected by the various local lodges. At this gathering, the Amalgamated Association formulates its demands to be presented to employers at the yearly conference to renew the wage agreement, which also covers working conditions. This conference with employers is usually held in June. As yet no arrangements have been made for it and the meeting place has not been selected. Last year it was held in Atlantic City.

No difficulty is anticipated this year in reaching an agreement on the wage scale, and a continuance of the present agreement, without essential modifications or change, is expected.

Simplified Amplifying Gage

An amplifying gage differing from its larger tool only in that it is of limited range and has fewer attachments, is being offered by the American Gage Co., Dayton, Ohio. There has been a demand for a moderate priced tool of this kind especially for use in the grinding department where more gages are usually required than in the inspection department. The gage is furnished in two sizes, one of which measures round work from $\frac{1}{4}$ to 2 in. in diameter, and the other from 2 to 4 in.



In the Cleaning Room a Battery of Saws Is Used to Cut Off Heads and Risers. The charging box receives scrap for the furnaces

The Dependability of Cast Iron Welding*

Preheating and Annealing Essential—Correct Preparation of the Casting—Some Results Attained Commercially

THE subject of dependability of welding is one which I am sure can not be gone into too thoroughly by the welding industry, for it is one of the most important phases of the subject. Whoever is having welding done wants to know first whether a job can be welded; then, second, if the weld can be depended on.

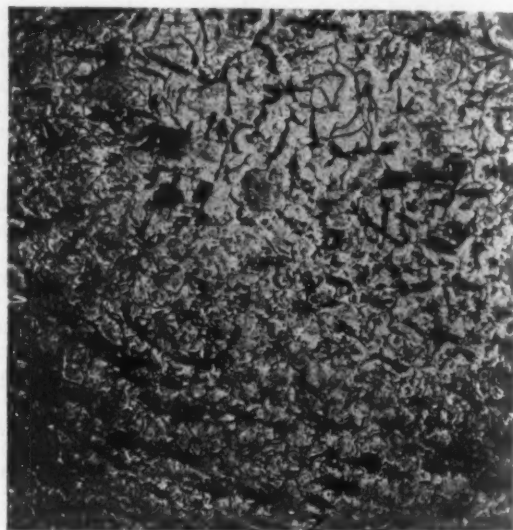
As the dependability of welding is a separate problem for each different metal welded, there is a great

Fig. 1 shows a cast iron weld magnified only two diameters; Fig. 2 shows part of the same specimen magnified 50 diameters. In the latter the weld junction extends diagonally across the point from northeast to southwest, the weld metal being at the left and the original cast iron to the right. The graphite plates in the weld metal are shown to be much smaller than in the original metal, and the photomicrograph shows good fusion and bonding without evidence of



Fig. 1 (Left)—Photomicrograph of a Cast-Iron Weld Magnified Only Two Diameters

Fig. 2 (Below)—Photomicrograph of a Portion of Fig. 1 Magnified 50 Diameters, Only Slightly Reduced from the Original



deal more to be said than can be covered in this discussion. For this reason only the dependability of cast iron welds will be discussed here.

Let us first consider the relative strength of deposited metal in cast iron welding. This gives us an idea as to what to look for as best practice.

The strength of the deposited metal in good cast iron welds is usually equal to that of the original metal of the casting. This is because the deposited metal is of excellent material to begin with and is kept free of oxide and dirt by being puddled and treated with flux as it is being filled in.

The microscope almost always shows that cast iron

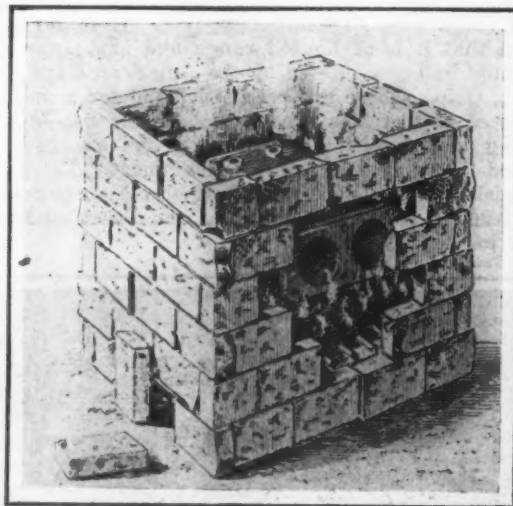


Fig. 3—Typical Preheating Oven for Preparing Cast Iron for Welding. An automobile cylinder block is contained in this furnace

weld metal is of finer grain and is cleaner than the original metal. This is an excellent check on the process. Physical tests also indicate that the deposited metal is fully up to the strength of the original cast iron.

In gray cast iron the metal is not capable of forging, therefore the deposited metal is always of the same grain structure as the base metal. The metallurgy of cast iron welds is illustrated in Figs. 1 and 2.

hard spots or impurities. So much for the theoretical possibilities. Let us now consider the result of practice.

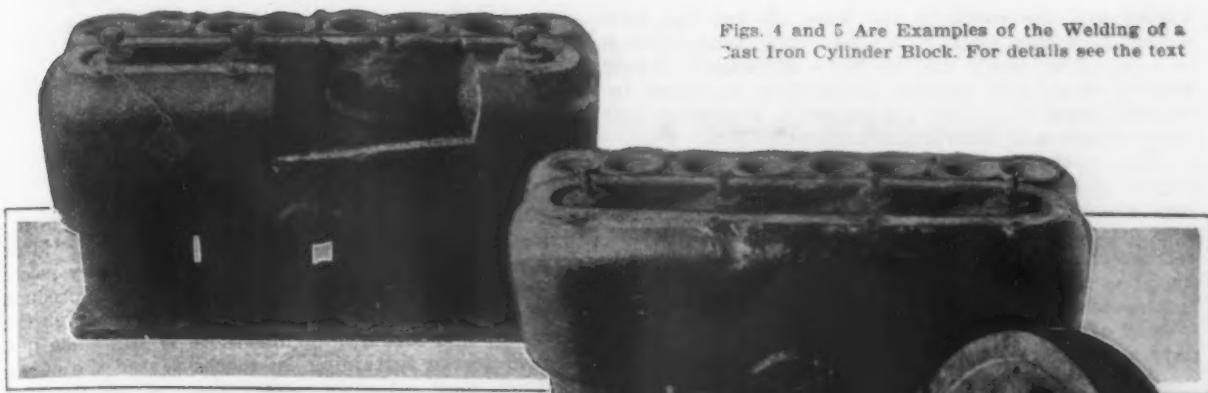
It may be said positively that almost perfect results are being obtained in cast iron welding. Still nearly everyone knows instances of failure in welded castings. How can we reconcile such a diversity of results? The answer is found in the preparation for welding and treatment subsequent to welding.

Where cast iron is not prepared for welding by adequate preheating, the cooling down of the section welded sets up severe stresses in the casting. As cast iron is inelastic, it cracks instead of pulling or buckling, as sheet steel does. An interesting point is that these "cooling down" cracks often occur at some place other than in the weld. The deposited metal can and should be cleaner and stronger than normal cast iron; so unless the section is smaller at the weld than elsewhere, nearly any cooling down cracks should be outside the weld. Cooling-down cracks are a sign of poor mechanics, indicating lack of understanding of the effect of heat on castings.

Correct preparation of castings, by having the complete casting at a red temperature, insures excellent results because the actual welding of cast iron is not difficult. Many operators will disagree with this conclusion because they know that work on large iron castings is arduous, often being both a lengthy job and a hot one. But the actual manipulation of the torch is easy as compared to the operative skill required with many other metals.

In considering what should be expected, it is not necessary to go a single step beyond what has been

*From a paper read by G. O. Carter, consulting engineer Linde Air Products Co., before Cleveland section of the American Welding Society.



Figs. 4 and 5 Are Examples of the Welding of a Cast Iron Cylinder Block. For details see the text

done. There are a dozen large shops in the country where such splendid gray iron welding is being done day after day that the results approximate 100 per cent. These shops do not think of handling any ordinary job without completely preheating it. There are special cases where partial preheating is sufficient and where it would be difficult to heat an entire casting to a red temperature. A good mechanic who understands expansion and contraction can work out problems of partial preheating, but any organization may be sure of its work if castings are completely preheated as regular practice.

This has been known for 15 years or more because the very earliest engineers of the process advocated it then. Why has any welding shop failed to use this soaking preheat? The only real answer is the failure of the welding shops to generally appreciate the complete dependence of cast iron welding results on preheating, and the natural disposition of the operator to work under the most comfortable conditions. Welding preheated castings is hot work at the best, even when the operator has a long-handled blowpipe and is welding through an opening in asbestos sheathing. Some welders, finding asbestos gauntlets insufficient protection for hands and wrists, rig up asbestos shields or guards on the blowpipe resembling the "bells" on fencing foils. It would seem that some sort of protection for hands and face, or even for the whole body, might be devised—something that would adequately protect the operator without impeding his freedom of action in welding. This



Fig. 7—Welding a Crack in a Large Die Press Frame of Cast Iron

is a matter that might well receive the joint consideration of operators and equipment manufacturers.

Most welding shops have been started by welders who have had the atmosphere of other shops. Knowing that heavy cast iron welding is hot work when preheat is used, these proprietors have too often sympathized too much with the operators for their own good by permitting attempts at welding without the castings being preheated. The penalties have been cooling cracks which were no fault of welding but resulted in a general lack of confidence in welding of gray iron castings.

Fig. 6—Part of an Intricate Hot Water Furnace Casting. Many of Which Become Broken. Successfully Welded After Proper Preheating

Welders become accustomed to working close to hot preheated castings just as furnace men in mills get accustomed to hot work. The shops which are now doing excellent cast iron welding do not seem to have trouble getting and holding good welders. The proof of the dependability of oxy-acetylene welding of iron castings is thus covered as to past performances. Any skeptic can be referred to some shop in his neighborhood where excellent practices are being followed.

In one large shop over 250 jobs requiring a large furnace or the building of loose-brick furnaces were welded in a year without the loss of a single weld. Other shops report similar information.

In Cleveland there is one company where welding of iron castings in production work has been wonderfully systematized and almost perfect results have been and are being obtained. This company is the Ferro Machine & Foundry Co., where hundreds of automobile engine castings are made each day. When small blow-holes or other superficial flaws are noted in engine block castings, the castings are sent to the welding room where they are pushed into a big annealing furnace which slowly heats them to a bright red heat. The properly heated castings are then carried to welding stations where the welders fill up the grooved out places, using the usual cast iron filler rods and fluxes. The welded castings are then carried to a sand pile where they are buried until they have cooled slowly after which they are sent along in the regular line of production.

Incidentally it may be noted that through use of a furnace which is heated by oil or gas there is a large saving in oxygen, acetylene and welding time which more than offsets the initial preparation costs so necessary for quality.

Typical examples of successful cast iron welding jobs are illustrated. Fig. 2 shows an automobile engine block in a loose brick furnace, using charcoal as the preheating means. It is obvious that the entire block will be heated, and by use of charcoal with its relative low temperature of combustion as compared to coke, the heating will be slow and uniform. When the casting is sufficiently heated, bricks will be pulled away to permit the operator to apply his torch to the place to be welded, which part should be uppermost and horizontal, if possible.

Fig. 4 shows a broken four-cylinder automobile engine block with a section of the water jacket cut out to permit reaching the broken cylinder. Fig. 5 shows this same casting after the cylinder has been

welded and the patch in the water jacket has been welded back into place. This particular kind of work is being done every day in large automobile repair welding shops and complete preheating is almost invariably used to assure a good weld, a casting free from strains and therefore not warped.

Fig. 6 shows almost as intricate a casting. It is part of a hot water furnace and is similar to castings which are being broken by the hundreds every year. It could never be successfully welded without correct preheat, but when properly handled the welding gives complete satisfaction. Think of the time and trouble saved by having castings of this kind welded instead of waiting for new ones which might require days to come from the foundry.

Partial preheat may be resorted to in many cases where it is apparent that severe strains will not be set up when the welded part cools. Fig. 7 shows a big die press frame having a crack thus welded. A competent mechanic should decide on whether such procedure is advisable before a job of this nature is undertaken.

Where a considerable volume of work is done the building of loose brick furnaces is a waste of time and the use of charcoal as a source of heat is relatively expensive. So work-shop furnaces with gas or oil fuel are used for preheating and annealing. Regular annealing furnaces, 8 ft. wide by 15 ft.



Fig. 8—A Pile of Welded Cast-Iron Air-Cooled Engine Cylinders. They developed defects which were thus rectified

long, are used in several places. For miscellaneous welding work, pit type furnaces are the most suitable as the operators are able to get at the work without removing it.

Fig. 8 shows a pile of air cooled engine cylinders which have been welded as a regular step in production as small defects developed. As might be expected where one operation is repeated so frequently practice has been standardized to give excellent results and the operation is looked upon as is a machine tool one. Gray iron castings, no matter how intricate, are being successfully welded and in the operation adequate preheating and annealing are essential.

"Use and Abuse of Electric Arc Welding in Locomotive Work," was the subject of a paper by Clay W. Roberts, Columbus, Ohio, shops, Pennsylvania Railroad, at the monthly meeting of the Pittsburgh Section, American Welding Society, in the industries building, Carnegie Institute of Technology, Pittsburgh, Tuesday evening, March 28.

INCREASED PRODUCTION

More Activity in the Youngstown District—Railroad Buying Helps

YOUNGSTOWN, April 4.—With accelerated operating schedules of iron and steel plants, unemployment is being dissipated in the Mahoning and Shenango Valleys. Leading employers predict that within the next 45 to 60 days, it will have wholly disappeared. March proved one of the best months for the industry in over a year with respect to new tonnage, and producers regard the outlook with considerably more favor than they did in February. While there is still some question as to the sustaining influences behind the current activity, most interests, nevertheless, regard the movement as marking a definite upward trend.

In one day's mail last week, a Valley independent received orders aggregating in excess of 6500 tons well distributed over its list of products. Mills are gradually building up moderate backlogs, but there is much yet to be desired in this respect. Most of the tonnage coming through is for small individual lots, but the aggregate represents sizable business.

Steel tonnage emanating directly and indirectly from the railroads is an aid in the current situation. The Republic Iron & Steel Co. is operating its spike and washer factory after a long suspension. One operating executive states that orders for its Bessemer department are being accumulated, and that its resumption may take place in April.

Broader Demand for Sheets

Because of the Valley's heavy sheet mill capacity, the broader demand for all three grades and for full finished stock has been a material factor in bolstering finishing mill averages. Some interests are inclined to feel that the requirements of the automobile industry for deep drawn sheets may show a falling off after May. While some 1000-ton lot orders for sheets have been placed with Valley makers, providing for extended deliveries, the bulk of the business runs to 100- to 300-ton orders. Buying is for miscellaneous requirements. Much roofing and corrugated stock is being shipped South; galvanized sheets are in demand by the building industry in a larger way; makers of metal barrels and containers are absorbing larger tonnages. Enamel ware manufacturers have placed some moderate business in this district. Stamping and pressed metal plants are taking larger quotas. Black sheets are being sold to the Ford Motor Co. by some interests to be used for unexposed parts, while blue annealed stock and strip steel are being consumed in crankcase production. The principal automobile interests in the Detroit and Indianapolis districts are buying sheets made in the Valley, either directly from producers or through jobbers and warehouse dealers.

Demand for semi-finished steel products, principally Bessemer and open-hearth sheet bars, preceded enlarged requirements for finished products, and expansion in active ingot capacity has been on a larger scale than in the rolling mills. Steel making in the Mahoning Valley is fully at 78 per cent.

Lowered Pig Iron Stocks

Depletion of pig iron stocks which were accumulated during the slack times in 1921 by steel plants in the Valley is an unfailing index of the betterment at the moment, as compared with conditions that prevailed to a large extent during the first three quarters of 1921. Blast furnace operations in the two Valleys reached a low point with but six of 47 stacks pouring metal. Despite this low rate of output, considerable iron was piled because steel-making demands were still less. Most of this accumulation has since been worked off. Blast furnaces in the Mahoning Valley are now being operated in excess of a 50 per cent rate.

The Wheeling Steel Corporation, which a few weeks ago resumed operation of its sheet plant at Beech Bottom, W. Va., on an open shop basis, now has about half of the capacity of this plant running.

Developing Foreign Trade by Pictures

Department of Commerce Aims to Interest Manufacturers
—Plans to Be Explained at Meeting
in Washington

BY L. W. MOFFETT

WASHINGTON, April 4.—The value of the motion picture or movie, as it is popularly called, is becoming increasingly apparent throughout the civilized world. No longer is it solely presented as a source of entertainment but its power as an advertising medium has been recognized to such an extent that both private industry and the Government have instituted it as one of the essential parts of their business. In this sense, Secretary of Commerce Hoover may be called a movie enthusiast. He is keenly aware of its value in promoting foreign trade. Other Government officials also have seen the value of the movie and used it for some years past. The Bureau of Mines, Department of Interior, has been active in the direction for the purpose of conducting a "safety first" movement.

To Develop Foreign Trade

The Government now, however, is attempting to impress industries with the importance of using the motion picture film to develop foreign trade. And in this connection the Bureau of Mines and the Bureau of Foreign and Domestic Commerce have joined hands for the development of the story of American industry as shown by the motion picture. That it has the sympathetic and active interest of industries of the country is made plain from the fact that the National Association of Manufacturers has announced the inauguration of a nation-wide effort to organize all the industries of the country that produce motion pictures, for a systematic, centered method of distribution that will not only cover the United States but will reach into other lands as well. President John E. Edgerton of the association has called a conference for April 11 at the Willard Hotel, Washington, of all manufacturers interested in the motion picture as a means of industrial education and salesmanship. He is assembling the manufacturers primarily to further the use of motion pictures in developing domestic markets and knowledge of industry. But in the broader field he sees an immediate necessity for this country to develop its industrial and sales pictures to the very highest point in order to keep abreast of other countries in the sweeping war for commerce that is being carried on by every powerful nation. The Government, through the bureaus mentioned, has engaged in a similar task and has met with considerable success.

Attitude of Steel Manufacturers

Frankness compels the statement that the iron and steel, machinery and allied industries, however, as a whole, have not as yet responded, as it had been hoped, to efforts to have them co-operate with the Government in its industrial motion picture campaign. The campaign being in its incipency, Government officials express confidence that sooner or later these industries may be made to realize the value of presenting pictorial stories in all corners of the earth through the movie of their business. The National Association of Manufacturers has this identical idea in mind and, therefore, is working with the Government to the end desired. The success of promoting foreign trade by use of the film has been fully realized by foreign countries for the past few years, and several of the larger European countries at this time are using this means of acquainting people throughout the world with the production and methods of manufacture of their various industries including iron and steel, machinery and related lines. They have consequently taken the lead of similar industries in the United States and now are broadcasting their films.

A recent instance of this are films showing the

manufacture of iron and steel products in England. British manufacturers already have begun a world-wide presentation of films showing the production in various lines of iron and steel manufacture. They have had their initial appearance in this country where they are to be given through moving picture houses. A showing of these films was made last week in Washington before Government officials and representatives of iron and steel companies in order to acquaint them with the aggressive campaign British steel makers have instituted to capture markets of the world. The films were obtained from the Bureau of Commerce Economics, Washington, by the Bureau of Mines and put on the screen under the direction of M. F. Leopold, the Government engineer, who has been directing the production of films for the Bureau of Mines for the past three years and now is also associated for the same purpose with the Bureau of Foreign and Domestic Commerce. While the British films really were both poorly prepared and presented because of the lack of sequence depicting the processes of manufacture, bad lighting, the duplication of identical processes and the absence of necessary explanatory wordings, it is manifest that the British and other European manufacturers are wide-awake to the value of the industrial movie. Both the National Association of Manufacturers and Government officials contend that American manufacturers must get more actively into the game and present their stories, but to do so in a better shape than foreign manufacturers so far have been able to do. They feel that the American film industry possesses the required superior technique to do this. It is pointed out that misleading stories regarding American industries have led consumers in foreign markets to have an entirely erroneous conception of United States as a manufacturing center. On the theory that the movie cannot present anything but a true picture, it is urged that the truth about American manufacturing plants and the way they are operated can be told concisely and impressively through the film.

Government Willing to Help

The Government is holding out a willing hand to all industries of the country. The cost of the actual photographic work, as well as the expense of making of additional prints of the films, is borne by the co-operating company.

In talking to *THE IRON AGE* regarding the procedure of preparing and presenting the movies, Mr. Leopold said: "The approximate cost for the production of a three reel film has usually been about \$4,000, and additional sets of a three-reel film cost about \$150 each. Should a company express a desire to produce an educational film, arrangements are made for the engineer to make a visit to the plant in question; after this inspection, it is possible to furnish the officials of the company an estimate of the approximate cost of its production:

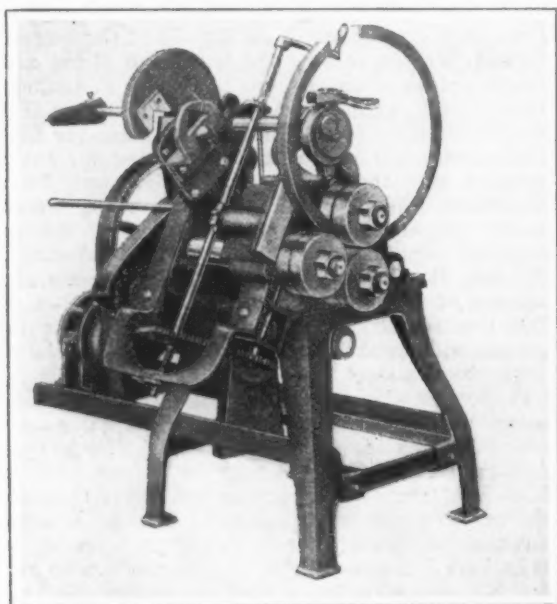
"The circulation of the film is provided for entirely by the bureaus, both in the United States and foreign countries," said Mr. Leopold. "Every endeavor will be made to provide for a film the widest possible circulation and if a company desires to educate the public of certain countries in the merits of American-made goods, as exemplified in its own products, every effort will be made to place those films where they will be most effective to this end."

Mr. Leopold has recently returned from a visit to several of the larger manufacturing centers of the country and has interviewed many officials, who have expressed a desire to co-operate with the Government.

Angle Iron Circular Bending Machine

A machine for cutting to length and bending 2 x 2 x ¼-in. angle iron to a true circle without twisting or defacing the angles is being offered by the Excelsior Tool & Machine Co., East St. Louis, Ill. Bar iron ½ x 4 in. and tee iron 2 in. and less, can be formed by the same rolls, which are adjustable. The machine can also be equipped with special rolls for pipe, channel iron and other shapes. It is understood that as now offered the machine represents the completion of several years' experimenting.

There are six rolls, two on each shaft, which are separated by steel washers provided to accommodate the thickness of the angle iron. Each roll has one straight and one rounded edge, and in rolling outward circles the upper rolls are placed with the square edges together with no spacers between them. The lower rolls have the round edges together with spacers between, to allow the thickness of the angle iron to be formed between them. The edge of the angle is placed toward the outside, and the front and rear guide set



Machine for Bending Angle Iron to True Circle Without Twisting or Defacing Angles. Bar and tee iron can also be formed, and, with special rolls, pipe, channels and other shapes

against the angle iron. The small guide is used on small circles only. The guides are adjusted outward until the angle is rolled straight or free from twist.

To roll inward circles, as in the illustration, the lower rolls are placed with square edges together without any space between them, the upper rolls having the rounded edges together with spacers between. These circles must be rolled single and the angle inserted with the edge inside. The same guides are used as previously. If the angle is hard to bend the square edge of the rolls is used against the flat of the angle.

The upper roll shaft has a 2½-in. lift, raised and lowered by eccentrics, and is set with allowance not exceeding the thickness of the angle between the upper and lower rolls. For duplicating circles of the same thickness a set screw adjustment is used and the eccentric clamped to hold the rollers together. The finished full circle is removed by releasing the clamp and raising the upper shaft. The back roll adjustment is graduated from 8 to 96 in. Angles 1½ x 3/16 in. can be bent outward two at a time.

All three pairs of rolls are driven, and small circles can be rolled by one pass with ends close together. By reversing the angles, allowing them to pass through the machine twice, both ends will be true to the circle.

The machine is operated through a friction clutch and can be started and stopped under pressure. Either belt or motor drive is provided, the motor being 3 hp. 1800 rpm. The frame is of semi-steel and the rolls of forged tool steel, hardened, and driven by heavy chain gears at 14 to 1 ratio. The speed of the rolls is 15 r.p.m.

or 25 lineal ft. per. min. The cutter attachment can be omitted. The floor space occupied is 4 x 5 ft. and the height 5 ft. The machine is known as the Excelsior No. 14.

All angle iron bent in circles must be of soft mild steel; re-rolled, crystallized or hard steel cannot be rolled in circles.

Automatic Roofing-Nail Machine

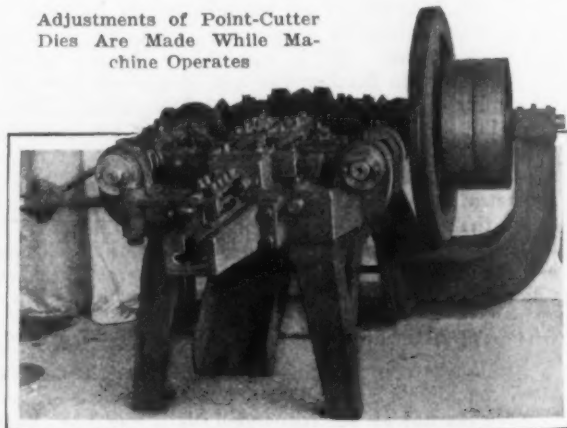
An automatic machine which is claimed to have broken all production records, making under continuous operation approximately 300 half-inch head roofing nails per min., is shown in the accompanying illustration. Under actual mill practice conditions the machine is said to have shown an efficiency of 85 per cent.

An outstanding feature is that adjustments of the point-cutter dies, both horizontal and vertical, can be made while the machine is in operation, eliminating the expense of shut down, for this purpose. Another feature is an arrangement for making common nails up to and including 16d, 3½ in. long, without interchanging any parts or attachments, a feature which is perhaps of particular interest to nail manufacturers whose roofing-nail business is only seasonal.

In operating the machine the wire is fed between straightening rolls into the gripping dies where it is gripped and the head formed with a single blow of the heading hammer. As the heading hammer recedes the straightener carriage moves forward the length of the nail; the wire is again gripped and the point-cutting dies clip the wire, making the point at the same time and leaving enough wire outside of the grip dies to make the head of the next nail. In proceeding forward again, the heading-hammer operates an ejector, which removes the finished nail from the machine. The wire straightener is of improved type intended to assure straight nails. Smoothness of operation is attained by the crankshaft being counterbalanced to compensate for the thrust of the header cross head, a feature of importance in high-speed work, as it reduces vibration to a minimum, adding to the life of the working parts.

The machine described is the Ryerson-Glader spe-

Adjustments of Point-Cutter Dies Are Made While Machine Operates



cial No. 3 roofing nail machine, marketed by Joseph T. Ryerson & Son, Sixteenth and Rockwell streets, Chicago, and is built on the same principle as the company's standard wire nail machines, although changed in arrangement and construction to produce the larger heads required on roofing nails.

World's Production of Graphite in 1921

The world's production of graphite in 1921 reached a lower figure than at any time since 1902, as shown by the statistics at present available, according to Arthur H. Redfield, of the U. S. Geological Survey. The world-wide depression in the graphite industry which characterized the year 1920 was continued in 1921. The total for 1921 is estimated at 85,000 metric tons against 100,000 tons in 1920, and 136,498 tons in 1913. Germany is credited with the largest output at 30,000 tons last year.

Papers for the Foundry Convention in June

The coming convention of American foundrymen at Rochester, N. Y., June 5 to 9, will be of an international character for besides the annual exchange paper of the Institute of British Foundrymen which will be read by F. J. Cook of the British Institute, two papers are being contributed by members of the French Foundrymen's Association and one by the president of the Belgian Association of Foundrymen.

In all, some 45 papers have been secured for the eight technical sessions, a partial list of which follows:

"Flask Equipment for Molding Machines," by Arnold Lenz, Saginaw Products Co., Saginaw, Mich.

"A Study of the Weight of Iron Castings," by J. D. Wise, Osborn Mfg. Co., Cleveland.

"Electrically Heated Metal Patterns," by C. A. Cremer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

"Investigations Relative to Insulated Core Oven Design and Performance," by C. F. Mayer Ohio Body & Blower Co., Cleveland.

"Belgian Method of Making Typewriter Frames," by J. Leonard, Liege, Belgium, president Belgian Foundrymen's Association.

"Design of Geared Ladles," by A. W. Gregg, Whiting Corporation, Harvey, Ill.

"Electric Cranes in Foundry Service," by A. H. McDougall, Whiting Corporation, Harvey, Ill.

"Accurate Control of Analyses in Acid Electric Steel Furnaces," by A. C. Jones, Electric Steel Co., Chicago.

"Proportions of Clay and Flour in Facings for Steel Castings," by R. J. Doty, Sivyer Steel Casting Co., Milwaukee, Wis.

"Progress in Open-Hearth Process," by Willis McKee, Author G. McKee Co., Cleveland.

"Side Blown Converters," by T. Leroy, French Foundrymen's Association.

"Tests with Cerium as a Deoxidizer and Desulphurizer in Red Brass, Cast Iron and Converter Steel," by L. W. Spring, Crane Co., Chicago.

"Impact Tests on Steel," by F. C. Langenburg, Watertown Arsenal, Watertown, Mass.

"Manufacture of Manganese Steel in the Electric Furnace," by John Howe Hall, Taylor-Wharton Iron & Steel Co., High Bridge, N. J.

"Research in the Foundry," by A. E. White, University of Michigan, Ann Arbor, Mich.

"Technical Control of McCook Field Foundry," by E. H. Dix, Jr., McCook Field, Dayton, Ohio.

"The Use of Secondary Metal in the Brass Foundry," by C. T. Bragg, Michigan Smelting and Refining Co., Detroit.

"Porosity of Non-Ferrous Metals," by R. R. Clarke, Pittsburgh.

"Aluminum and Aluminum-Alloy Melting Furnaces," by R. J. Anderson, Bureau of Mines, Pittsburgh.

"Melting Aluminum for Rolling Into Sheet," by J. A. Lange, Western Springs, Ill.

"Use of Secondary Aluminum Ingot in Foundry Practice," by W. M. Well, National Smelting Co., Cleveland.

"Two-Part Castings Made in Three-Part Molds," by W. H. Parry, Brooklyn.

"Eye Protection and Safe Clothing in the Foundry," by Buell W. Nutt, The Safety Equipment Service Co., Cleveland.

"Time Study Applied to Foundry Practice," by A. J. Kramer, Deering Works, International Harvester Co., Chicago.

"The Preparation of Steel Foundry Sand," by S. H. Cleland, National Engineering Co., Chicago.

"Tests of Molding Sand," by R. J. Doty, Sivyer Steel Casting Co., Milwaukee, Wis.

"The Significance of the Screen Tests of Molding Sand," by H. A. Schwartz, National Malleable Casting Co., Cleveland.

"The Relation of Temperature to the Form and Character of Graphite Particles in the Graphitization of White Cast Iron," by E. J. C. Fisher, Atlas Die Casting Co., Worcester, Mass.

"The Behavior of Fire Brick in Malleable Furnace Bungs," by H. G. Schurecht, Bureau of Mines, Columbus, Ohio.

"The Manufacture and Properties of Refractories for All Furnaces," by C. E. Bales, Louisville Fire Brick Co., Highland Park, Ky.

"Carbon Dioxide Recorders," by D. M. Scott, The T. H. Symington Co., Rochester, N. Y.

"Use of Oil as a Fuel for Melting Malleable Cast Iron," by S. Mackey and W. Hoernke, The Stowell Co., Milwaukee, Wis.

"Tests on Cast Iron," by R. S. McPherran, Allis-Chalmers Co., Milwaukee, Wis.

"Steel Castings vs. Malleable Castings," by J. W. McKeon, West Michigan Steel Foundry Co., Muskegon, Mich.

"Technical School Foundries," by Prof. J. D. Hoffman and R. E. Wendt, Purdue University, Lafayette, Ind.

Exchange paper of The Institute of British Foundrymen, by F. J. Cook of the Institute of British Foundrymen. The subject of Mr. Cook's paper has not been received.

In addition to the above papers there will be reports of the Association committees which are co-operating with the American Society for Testing Materials, and the committees on safety code, pattern standardization and foundry scrap.

To Study Trade Associations

WASHINGTON, April 4.—Appointment of a committee to study and report on the subject of trade associations was announced to-day by the Chamber of Commerce of the United States. The committee will direct its inquiry with a view to determining in what manner trade associations can render the greatest service to business and the public. It will hold its first meeting at the headquarters of the Chamber here on April 5.

"The Foreman and the Square Deal" was the theme of a talk delivered April 5 to the Youngstown Industrial Foremen's Club by C. L. Patterson, labor secretary of the National Association of Sheet and Tin Plate Manufacturers.

COMING MEETINGS

April

National Metal Trades Association. April 19 and 20. Annual meeting, Hotel Astor, New York. Secretary, Louis W. Fischer, Peoples Gas Building, Chicago.

American Gear Manufacturers' Association. April 20, 21 and 22. Annual meeting, Hotel Lafayette, Buffalo. Secretary, F. D. Hamlin, 4401 Germantown Avenue, Philadelphia.

American Supply and Machinery Manufacturers' Association and Southern Supply & Machinery Dealers' Association. Joint meeting. April 24 to 26, Birmingham. F. D. Mitchell, 233 Broadway, New York, is secretary of the American association and A. M. Smith, Smith-Courtney Co., Richmond, Va., is secretary of the Southern association.

National Machine Tool Builders' Association. April 25 and 26. Spring convention, Hotel Traymore, Atlantic City, N. J. General manager, E. F. DuBrul, 817 Provident Bank Building, Cincinnati.

Society of Industrial Engineers. April 26 to 28. Spring meeting, Hotel Statler, Detroit. George C. Dent, business manager, 327 S. La Salle Street, Chicago.

American Electrochemical Society. April 27 to 29. Spring meeting, Baltimore. Acting secretary, Dr. Colin G. Fink, 110 Park Avenue, New York.

May

Iron and Steel Institute. May 4 and 5. Annual Meeting. Quarters of Institution of Civil Engineers, London, England. Secretary, George C. Lloyd, 28 Victoria Street, S. W. London.

The National Supply and Machinery Dealers' Association. May 8, 9 and 10. Seventeenth annual convention, Marlborough-Blenheim Hotel, Atlantic City. Secretary, T. James Fernley, 504 Arch Street, Philadelphia.

American Society of Mechanical Engineers. May 8 to 10. Spring meeting, Atlanta, Ga. Secretary, Calvin W. Rice, 29 West Thirty-ninth Street, New York.

National Association of Manufacturers. May 8, 9 and 10. Annual Convention. Waldorf-Astoria Hotel, New York. General offices, 59 Church Street, New York.

National Foreign Trade Council. May 10 to 12. Convention Hall, Philadelphia. Secretary, O. K. Davis, 1 Hanover Square, New York.

National Sheet Metal Contractors' Association. May 15 to 19. Convention and exposition, Cadle Tabernacle, Indianapolis.

National Association of Purchasing Agents. May 15 to 20. Annual convention and exposition. Exposition Park, Rochester, N. Y. Secretary, H. R. Heydon, 19 Park Place, New York.

American Iron, Steel & Heavy Hardware Association. May 23 to 25. Annual meeting, Hotel Washington, Washington. Secretary, A. H. Chamberlain, Marbridge Building, New York.

American Society for Steel Treating. May 25 and 26. Sectional meeting, Pittsburgh. Secretary, W. H. Eiseman, 4600 Prospect Avenue, Cleveland.

OHIO FOUNDRYMEN

First Annual Meeting of State Association Held at Columbus

The first annual meeting of the Ohio State Foundrymen's Association was held at the Deshler Hotel, Columbus, March 31. While the attendance was not as large as was hoped for, a fair representation of the members was present and some business of importance, including the election of officers and the adoption of a code of uniform foundry practice, took place.

At the morning session, the principal business was the election of officers and the reading of the yearly reports of the secretary and treasurer. The election resulted as follows: President, F. H. Huber, American Rolling Mill Co., Middletown; vice-president, C. F. Meade, Fulton Foundry & Machine Co., Cleveland; treasurer, G. H. Alten, Alten Foundry & Machine Co., Lancaster; secretary, Samuel Powell, Jr., Hamilton; directors for the three year term, J. W. Fellmeth, the Marion Steam Shovel Co., Marion; E. B. Philips, the Champion Engineering Co., Kenton; W. J. Ray, the Gilliam Mfg. Co., Canton; A. A. Nolte, Nolte Brass Co., Springfield, and Joseph Westendorf, Dayton Castings Co., Dayton.

The secretary's report showed that the association had now 116 members, a substantial increase during the year. It also referred to a number of changes made in the pig iron contract, particularly with respect to the clauses regarding cancellations. Mr. Powell gave a résumé of the year's work, laying particular emphasis on the value of the reports which the association sends out each month.

One of the most important matters to come before the meetings was the report of the committee on uniform foundry practice. The committee had sent out questionnaires to foundrymen throughout the State and the report was based on the answers received. Considerable discussion ensued and a number of changes were made in the committee's report. The meeting decided that it would recommend to its members the adoption of the following trade customs:

1. Patterns to be in condition to make castings of the quality and quantity required.
2. Correctness of patterns and core boxes to blue prints rests with customers.

3. If patterns require stopping-off, or skeleton patterns are furnished, an extra charge will be made.

4. Any expense due to incorrectness of patterns and core boxes shall be borne by customers.

5. Repairs and changes in patterns by customer's orders at expense of customer.

6. Patterns to be painted in three colors showing core in red, machine surface in yellow, and rough casting in black.

7. All patterns, core boxes and loose pieces thereof should be properly numbered for identification.

8. All freight, drayage, boxing and crating, to and from foundry, on patterns, at expense of customer.

9. Foundry not responsible for loss of or damage to patterns by fire or theft.

10. Patterns not in use for a period of six months may be subject to storage charges.

11. Defective castings to be replaced by the foundry free of charge, if reported within a reasonable length of time.

12. Foundry not responsible for any expense incurred by customer on defective castings.

13. Claims for error in weight or number to be made within five days after receipt of castings.

14. Boxing, crating or bundling of castings not specified in contract are at the expense of customers.

15. All castings are sold as rough castings f.o.b. foundry unless otherwise stated.

16. In case customers require special production service to secure quick delivery, an extra charge shall be made.

17. Customers to be charged with cost of cores and molds discarded due to change in patterns or core boxes.

18. All changes in orders of any description must be made in writing.

19. Foundry shall not be liable in damages for failure to deliver, caused by strikes, differences with employees, accidents at foundry, or other causes beyond their control.

20. Cancellations of orders are to be by mutual consent only.

21. Unless otherwise agreed, quotations are for acceptance within 30 days.

Following a luncheon, the meeting reassembled to hear an address by Malcolm Jennings, secretary of the Ohio Manufacturers' Association, who spoke to the members on the importance of keeping in touch with legislation introduced in the State legislature which may vitally affect their interests. Following Mr. Jennings' address, W. W. Lewis, manager of the development section of the sales department of the American Rolling Mill Co., described the manufacturing of steel and finished products at the Middletown plant. The lecture was accompanied by motion picture views and was greatly enjoyed by the members.

NATIONAL METAL TRADES

Training of Apprentices and Other Subjects to Be Considered in Convention

The training of apprentices, the coal strike and the railroad situation will be prominent among the topics which will be discussed at the twenty-fourth annual convention of the National Metal Trades Association which will take place at Hotel Astor, New York, on April 19 and 20. The association committee on apprenticeship has examined the many methods of training apprentices in vogue in American factories and shops, and has sought to incorporate their virtues and eliminate their defects in a training course which it has evolved. In the report which the committee has prepared, it has laid down courses of shop work for the apprentice, suggestions for a standard diploma, for an interchange of apprentices among the smaller or specialty shops, and other recommendations which are based upon the experience of the most advanced American manufacturers.

An address by Hon. E. L. Greever, Tazewell, Va., will show how the non-union coal operators of West Virginia have fought successfully against the efforts to unionize their mines. L. F. Loree, president the Delaware & Hudson R. R., is expected to speak on the subject of transportation. The program is briefly as follows:

Wednesday Morning Session

Appointment of convention committees

Reports of officers

"The Industrial Emancipation of San Francisco," Robert M. Lynch, president, San Francisco Chamber of Commerce

Wednesday Afternoon

"American Industry and the Stabilization of Europe," Harold

G. Moulton, University of Chicago

Address, L. F. Loree, president, Delaware & Hudson R. R.

"The Farmer and the Balance Wheel," A. M. Loomis, Wash-

ington office of the National Grange

"Facts and Fancies About Wages in Basic American In-

dustries," Magnus W. Alexander, managing director,

National Industrial Conference Board, New York

Convention banquet, 7 p. m.

Thursday Session

"West Virginia Fights for Freedom," E. L. Greever, Greever,

Gillespie & Divine, Tazewell, Va.

"Industrial Courts," James A. Emery, counsel, National Asso-

ciation of Manufacturers, Washington

Report of Committee on Industrial Education, Harold C.

Smith, chairman

Annual Report, Philip C. Molter, superintendent, Department

of Industrial Training, National Metal Trades Association

Presentation of manual of apprenticeship training

Standardizing to Meet Business Revival

"When business revives the position of individual companies generally will resemble that of the wise and foolish virgins—those who are ready and those who are not," said W. H. Leffingwell, president Leffingwell-Ream Co., Chicago and New York, in an address on standardization at a meeting of New York section of the Taylor Society, held in New York, March 30. The hundreds of companies which during the present depression have cut their organizations to pieces, practically destroying them, are not going to be ready to take the business, he said, pointing out that it is not an easy task to build up a weakened organization.

As a remedy for this, the preparation of standardized procedure was advocated. Standardization, he said, stabilizes an organization. There are a multitude

of ways to do a thing, and standardization takes more thought and action than ordinarily supposed, he emphasized. "Not 1 per cent of the business men of this country are adopting scientific management or standardization," he said, "although if they could see the profit of it, there wouldn't be enough management engineers to fill the demand."

Mr. Leffingwell's talk dealt more specifically with standardization of office procedure and included the use of organization charts, making of office manuals, standardization of policies and jobs. Standardization of printing and uniform practice in forms was a subject of discussion, M. L. Cary, of the United States Rubber Co., New York, outlining briefly the practice of his company in the matter.

Establishing standard practice with a view to meeting present competition, which he said would become very intense within the next few years, as well as with a view to preparing for the resumption of business activity, was urged by Dr. H. S. Person, managing director, in his discussion of Mr. Leffingwell's address.

Dr. Yoici Uyeno, chief director of the Institute of Industrial Psychology, University of Tokio, spoke briefly on the results of his scientific management work in two plants in Japan. Wallace Clark, industrial engineer, New York, was chairman of the meeting.

To Discuss Electric Cast Iron at Baltimore

A feature of the annual spring meeting of the American Electro-chemical Society at Baltimore, April 27, 28 and 29, is to be a symposium on electric cast iron. The program for this session on Thursday morning, April 27, which will be presided over by A. T. Hinckley and Bradley Stoughton, follows:

"Cast Iron as Produced in the Electric Furnace and Some of Its Problems," by George K. Elliott.

"A Comparison Between the Shaft and Open Top Furnaces in the Manufacture of Pig Iron Electrically from Ore," by R. C. Gosrow.

"Synthetic and Electric Pig Iron Specially Considered," by Robert Turnbull.

"A Study of Carburization in the Manufacture of Synthetic Cast Iron," by Clyde E. Williams and C. E. Sims.

"Electric Cast Iron," by W. E. Moore.

"Operating Data Obtained in Electric Furnace Cast Iron Foundry," by J. L. Cawthran.

"Melting of Cast Iron in the Booth Rotating Electric Furnace," by H. M. Williams.

"Electric Furnace Iron and Steel; Intermittent and Alternating Operations," by W. E. Cahill.

Note.—In case of prolonged animated discussion, the papers not covered during the morning session will be presented and discussed at an adjourned session at 2 p. m.

Sessions on Friday and Saturday mornings will be devoted to about 15 papers on various miscellaneous subjects of general interest.

On Thursday evening Prof. R. W. Wood of Johns Hopkins University will give a lecture on "Fluorescence" at the university. An informal dance will follow.

On Friday evening, April 28, a complimentary smoker will be given by the chemists and engineers of Baltimore, at the Engineers' Club, half a minute's walk from the Emerson Hotel, the convention headquarters. Prof. Roscoe R. Hyde will give a 15 minute talk on "Heredity."

On Thursday afternoon, April 27, visits to one or more of the following plants can be arranged for: Baltimore Copper Works; Standard Oil Co.; Eastern Rolling Mill; Baltimore Tube Co.; Howard Refractories Co.; Bethlehem Steel Co. and Shipyard; Fertilizer plants; Pennsylvania Water & Power Co.; Consolidated Gas & Electric Co., and Emerson Drug Co.

The Brown Hoisting Machinery Co., Cleveland, has taken a contract for an ore bridge to be erected at Buffalo for the Rogers-Brown Iron Co., to replace a bridge that was blown down during a storm a few months ago. This will be a standard bridge with a 233-ft. span, having a raisable apron at the front and a 60-ft. cantilever at the rear. It will be equipped with a 5-ton or 80 cu. ft. bucket.

Graton & Knight Mfg. Co. Reorganized

A complete change in management of the Graton & Knight Mfg. Co., Worcester, Mass., manufacturer of leather belting and leather specialties, was made at the annual meeting of the stockholders, held March 30. Seven of the nine old directors retired from the board, the exceptions being John E. White, president of the Worcester Bank & Trust Co., and Walter M. Spaulding, president of the Graton & Knight Mfg. Co. since 1909. The stockholders elected Mr. White president and Mr. Spaulding chairman of the board of directors. The new directors are Dr. Homer Gage, president Crompton & Knowles Loom Works, Worcester; Harry G. Stoddard, vice-president and general manager Wyman-Gordon Co., Worcester; W. R. Grace, vice-president and treasurer Ingersoll-Rand Co., New York; Stanley A. Russell, vice-president National City Co., New York; and George de B. Greene, of the banking house of E. H. Rollins & Sons, New York and Boston. Charles A. Bartlett was elected treasurer; Stanley G. Barker, clerk, and Charles M. Thayer, of the law firm of Thayer, Smith & Gaskill, counsel, all being Worcester men. President White will devote a large part of his time to the management, his responsibilities including those of general manager. Mr. Spaulding will continue to be an active factor in the business.

The financial statement for the year shows a decrease in current assets from \$15,677,443 to \$8,045,404. Inventory reduction was \$5,131,852. The operating deficit for the year was \$3,567,772, which was partly offset by a surplus created by revaluation of plant and securities amounting to \$1,834,937. The combined items of capital stock, surplus and reserves which at the beginning of the year were \$13,335,852 were reduced to \$8,733,686. The net deficit for the year was \$1,732,835.

Besides the leather belting plant at Worcester, the Graton & Knight Mfg. Co. operates those of the Edward R. Ladew Co., Glen Cove, N. Y.; the New York Leather Belting Co., Brooklyn, and the Schultz Belting Co., St. Louis, and subsidiary factories at Cleveland, Detroit, Lewiston, Me.; Buffalo, San Francisco, South Attleboro, Mass., and Montreal, Canada.

Stocks of Coal to Meet Strike

Reports from the United States Geological Survey and the Census Bureau show that the stocks of bituminous coal in the hands of consumers on March 1 amounted on the average to a 43-day supply. This compares with 45-day supply held at the time of the armistice, and based upon the larger productive activities of that date.

The supply throughout New England, New York, New Jersey and Michigan represented between 60 and 90 days' requirements, while the supply throughout the remainder of the principal manufacturing sections of the country was reported at between 30 and 60 days' requirements. This represented an increase in every State from New Jersey to Missouri, as compared with the stocks on Jan. 1, but a decrease throughout New England.

Molybdenum and Cerium Steels

The Ithaca, N. Y., office of the Bureau of Mines is continuing the study of special series of molybdenum and cerium steels. Endurance tests with special regard to the effects of inclusions on endurance have recently been made. The final report on cerium has been made by Dr. H. W. Gillett to the Welsbach Co., which is the chief cerium producer and which co-operated in this work, being interested in finding new applications for this metal.

A new shape of test bar has been adopted which seems better suited to endurance testing, and over 200 test bars were prepared and sent out for machining. Metallographic study of inclusions and other causes of fatigue failure has been continued on bars prepared by the Bureau of Mines, and on some obtained from the University of Illinois and the U. S. Naval Experiment Station.

Steel Castings Prices Are Reduced

Fewer Weight Divisions in List and Alphabetical Arrangement of Discounts—Also New Features of Schedule

THE list prices and discounts on steel castings, announced by the American Steel Foundries as effective Feb. 1, aroused much interest among both buyers and manufacturers because they represented a new method of quoting differing materially from that in vogue previously. Whereas formerly separate prices were quoted for each class of castings and each subdivision of that class, the new schedule was prepared for the purpose of simplifying a situation which was confusing to both seller and user. Hence 17 list prices graduated according to weight were established and a discount applying against this list was fixed for each kind of casting. In this manner the price relationship of the various kinds of castings to one another was made clear in contrast with the older method of quoting under which there was no uniformity in the weight divisions used for the various kinds of castings, and each casting had a separate price.

Since the list prices and discounts were made public, a number of other manufacturers of castings have adopted this method of quoting in preference to the older practice and favorable comment has been received from users. Certain criticisms were also received and it was with the view of meeting the objections raised that the American Steel Foundries made a number of changes in its schedule. It was found that the larger buyers of castings prefer fewer divisions of weights than were used in the list of Feb. 1, and to meet this situation the number of divisions was reduced to 12. The grouping of the various castings under classes has also been abandoned, the castings being arranged alphabetically instead. This change will, it is believed, save the time of the buyer as it will eliminate one step necessary in looking up the price of a casting.

In addition to making these changes in method, the American Steel Foundries also revised both its list prices and discounts to reflect as accurately as possible the present market on each kind of casting and each division of weight under each kind of casting. The next result is a general reduction on all castings, the reduction being somewhat greater on the lighter than on the heavier castings.

List Prices for Steel Castings

Covering steel castings produced in accordance with the requirements of American Society for Testing Materials' standard specifications for steel castings.

Division of Weight:	Per 100 Lb.
Over 1 to 10 lb.	\$23.00
Over 10 to 25 lb.	20.20
Over 25 to 50 lb.	15.90
Over 50 to 100 lb.	12.80
Over 100 to 250 lb.	11.80
Over 250 to 500 lb.	10.85
Over 500 to 1,000 lb.	9.75
Over 1,000 to 2,500 lb.	9.05
Over 2,500 to 5,000 lb.	8.75
Over 5,000 to 10,000 lb.	8.40
Over 10,000 to 50,000 lb.	8.15
Over 50,000 lb.	9.50

Extras to Be Added to Net Prices:	Add Per 100 Lb.
For carbon 0.50 to 0.70.	\$0.25
For carbon 0.70 to 1.00.	.50
For carbon 1.00 to 1.25.	.75
For carbon 1.25 to 1.50.	1.00
For carbon 1.50 and over.	1.75
For 2½ to 3½ per cent nickel.	2.75
For 0.18 vanadium.	2.95
For 1 per cent chrome.	1.00
For 1 per cent chrome and 2 per cent nickel.	2.50
For 1 per cent chrome and 0.18 vanadium.	3.95
For steam test on any casting.	.25
For all castings with water circulating pipes.	20 per cent

Freight Allowance

The prices obtained after applying the discounts cover the castings in the rough, f.o.b. our works, with published rate of freight allowed to the freight station of purchaser, other than railroads, located within a line drawn from Boston through Schenectady, Rochester and Niagara Falls, N. Y., Detroit, Duluth, Minn., St. Louis, Cincinnati, Washington, Cape May, N. J., and other Atlantic Ocean terminal points between Cape May and Boston. Prices to railroads are f.o.b.

our works, with published rate of freight allowed to the nearest point on the line of their road located in the territory mentioned above. For deliveries outside of the territory mentioned, on shipments to all purchasers, freight will be allowed only to the boundary line; the excess to be paid by the purchaser.

Discounts as of April 1, 1922, Are as Follows:

Name of Casting:	Discount, Per Cent
Ammonia fittings	15
Annealing boxes	37½
Annealing pots	37½
Annealing bottoms	57½
Anode plates	60
Arms for boiler riveters	15
Ball and socket joints for dredges	30
Bells for blast furnaces	37½
Blast furnace fittings	37½
Blast furnace valves	37½
Blast furnace miscellaneous	47½
Boiler riveter arms	15
Boiler saddles	30
Bolster center fillers and rear draft lugs or backstops combined:	
In lots of 1 to 49 pieces	32½
In lots of 50 to 99 pieces	37½
In lots of 100 to 249 pieces	42½
In lots of 250 to 499 pieces	47½
In lots of 500 to 999 pieces	52½
In lots of 1,000 and over	57½
Bolster center fillers (plain):	
In lots of 1 to 49 pieces	37½
In lots of 50 to 99 pieces	42½
In lots of 100 to 249 pieces	47½
In lots of 250 to 499 pieces	52½
In lots of 500 to 999 pieces	57½
In lots of 1,000 and over	62½
Bottom plates, refractory	35
Brake wheels, crane	7½
Bridge blocks:	
In lots of 1 to 49 pieces	52½
In lots of 50 and over	57½
Bridge shoes:	
In lots of 1 to 49 pieces	52½
In lots of 50 and over	57½
Bumpers for mine cars:	
In lots of 1 to 49 pieces	37½
In lots of 50 to 99 pieces	42½
In lots of 100 to 249 pieces	47½
In lots of 250 to 499 pieces	52½
In lots of 500 and over	57½
Cement mill rollers	42½
Cement mill tires	30
Cement mill miscellaneous	32½
Center plates and bolster center fillers combined:	
In lots of 1 to 49 pieces	32½
In lots of 50 to 99 pieces	37½
In lots of 100 to 249 pieces	42½
In lots of 250 to 499 pieces	47½
In lots of 500 to 999 pieces	52½
In lots of 1,000 and over	57½
Center plates (plain):	
In lots of 1 to 49 pieces	42½
In lots of 50 to 99 pieces	47½
In lots of 100 to 249 pieces	52½
In lots of 250 to 499 pieces	57½
In lots of 500 to 999 pieces	62½
In lots of 1,000 and over	67½
Center stems, crane	7½
Centrifugal pump castings	•
Charging bar supports	7½
Charging box heads and ends (cored):	
In lots of under 100 pieces	45
In lots of 100 pieces and over	50
Charging box heads and ends (not cored):	
In lots of under 100 pieces	50
In lots of 100 pieces and over	55
Charging boxes	50
Circle plates, refractory	45
Column bases:	
In lots of 1 to 49 pieces	62½
In lots of 50 and over	57½
Column guides for mine cars:	
In lots of 1 to 49 pieces	27½
In lots of 50 to 99 pieces	32½
In lots of 100 to 249 pieces	37½
In lots of 250 to 499 pieces	42½
In lots of 500 and over	47½
Copper molds	42½
Copper mine miscellaneous	37½
Counter balances	45
Coupler carriers:	
In lots of 1 to 49 pieces	47½
In lots of 50 to 99 pieces	52½
In lots of 100 to 249 pieces	57½
In lots of 250 to 499 pieces	62½
In lots of 500 to 999 pieces	67½
In lots of 1,000 and over	72½
Coupling boxes	50

*See note, page 937.

	Discount, Per Cent		Discount, Per Cent
Cradles for mine cars:		Link and pin drawheads:	
In lots of 1 to 49 pieces.....	27 1/2	In lots of 1 to 49 pieces.....	37 1/2
In lots of 50 to 99 pieces.....	32 1/2	In lots of 50 to 99 pieces.....	42 1/2
In lots of 100 to 249 pieces.....	37 1/2	In lots of 100 to 249 pieces.....	47 1/2
In lots of 250 to 499 pieces.....	42 1/2	In lots of 250 to 499 pieces.....	52 1/2
In lots of 500 and over.....	47 1/2	In lots of 500 and over.....	57 1/2
Crank castings, miscellaneous overhead.....	37 1/2	Locomotive miscellaneous.....	42 1/2
Crank discs.....	45	Machine work.....	†
Crank webs.....	45	Manhole covers.....	30
Cross boxes.....	30	Manhole frames.....	30
Cross-overs.....	15	Manifolds.....	15
Crown wheels for sugar mills.....	52 1/2	Mine car miscellaneous:	
Crusher frames, jaw.....	35	In lots of 1 to 49 pieces.....	32 1/2
Crusher rolls, hollow.....	15	In lots of 50 to 99 pieces.....	37 1/2
Crushing machinery miscellaneous.....	40	In lots of 100 to 249 pieces.....	42 1/2
Cutter heads dredge.....	•	In lots of 250 to 499 pieces.....	47 1/2
Cylinders, accumulator:		In lots of 500 and over.....	52 1/2
With walls over 1 1/2 in. thick and simple flange on		Mining machine miscellaneous.....	42 1/2
one end.....	17 1/2	Motor supports.....	7 1/2
With walls 1 1/2 in. thick or less and simple flange on		Nozzles.....	30
one end.....	7 1/2	Nuts, hydraulic press.....	55
All other designs.....	Net	Pan rims.....	20
Cylinders, hydraulic press:		Passenger car castings.....	•
With plain surface and standard rectangular flange..	32 1/2	Pedestals for mine cars:	
With irregular contour; wings, or special cored open-		In lots of 1 to 49 pieces.....	27 1/2
ings and flanges.....	22 1/2	In lots of 50 to 99 pieces.....	32 1/2
Die blocks.....	47 1/2	In lots of 100 to 249 pieces.....	37 1/2
Discs, crank.....	45	In lots of 250 to 499 pieces.....	42 1/2
Draft lugs (short):		In lots of 500 and over.....	47 1/2
In lots of 1 to 49 pieces.....	47 1/2	Peels and peel heads.....	7 1/2
In lots of 50 to 99 pieces.....	52 1/2	Pinions, mill:	
In lots of 100 to 249 pieces.....	57 1/2	Weighting less than 1000 lb. each.....	22 1/2
In lots of 250 to 499 pieces.....	62 1/2	Weighting 1000 to 5000 lb. each.....	32 1/2
In lots of 500 to 999 pieces.....	67 1/2	Weighting over 5000 lb. each.....	42 1/2
In lots of 1,000 and over.....	72 1/2	Pipe fittings (light section).....	15
Dredge piping.....	30	Pipe fittings (heavy section).....	30
Dredge miscellaneous.....	•	Piping, dredge.....	30
End carriages, crane.....	17 1/2	Platen castings.....	47 1/2
Engine frames:		Propeller blades.....	20
Weighting less than 1000 lb. each.....	12 1/2	Propeller hubs.....	45
Weighting 1000 to 2500 lb. each.....	25	Propeller wheels.....	10
Weighting over 2500 lb. each.....	37 1/2	Pulleys:	
Flange fittings (heavy).....	30	In lots of 1 to 49 pieces.....	30
Flanges:		In lots of 50 to 99 pieces.....	35
In lots of 1 to 49 pieces.....	42 1/2	In lots of 100 and over.....	40
In lots of 50 to 99 pieces.....	47 1/2	Pumping machinery castings.....	•
In lots of 100 and over.....	52 1/2	Push pole pockets:	
Flywheels.....	45	In lots of 1 to 49 pieces.....	47 1/2
Flywheel hubs.....	45	In lots of 50 to 99 pieces.....	52 1/2
Flywheel segments.....	45	In lots of 100 to 249 pieces.....	57 1/2
Frames, jaw crusher.....	35	In lots of 250 to 499 pieces.....	62 1/2
Freight car miscellaneous:		In lots of 500 to 999 pieces.....	67 1/2
In lots of 1 to 49 pieces.....	42 1/2	In lots of 1,000 and over.....	72 1/2
In lots of 50 to 99 pieces.....	47 1/2	Racks, long hollow for cranes.....	Net
In lots of 100 to 249 pieces.....	52 1/2	Ram frames.....	7 1/2
In lots of 250 to 499 pieces.....	57 1/2	Rams, hammer.....	47 1/2
In lots of 500 to 999 pieces.....	62 1/2	Refractory miscellaneous.....	25
In lots of 1,000 and over.....	67 1/2	Riding rings.....	30
Gears and pinions:		Riveter frames.....	47 1/2
In lots of 1 to 49 pieces.....	42 1/2	Riveter miscellaneous.....	35
In lots of 50 to 99 pieces.....	47 1/2	Riveter stakes.....	47 1/2
In lots of 100 and over.....	52 1/2	Road machine miscellaneous.....	42 1/2
Gear covers.....	7 1/2	Rockers for mine cars:	
Gear racks:		In lots of 1 to 49 pieces.....	27 1/2
In lots of 1 to 49 pieces.....	42 1/2	In lots of 50 to 99 pieces.....	32 1/2
In lots of 50 to 99 pieces.....	47 1/2	In lots of 100 to 249 pieces.....	37 1/2
In lots of 100 and over.....	52 1/2	In lots of 250 to 499 pieces.....	42 1/2
Gear segments:		In lots of 500 and over.....	47 1/2
In lots of 1 to 49 pieces.....	42 1/2	Rolls:	
In lots of 50 to 99 pieces.....	47 1/2	Weighting less than 1000 lb. each.....	27 1/2
In lots of 100 and over.....	52 1/2	Weighting 1000 to 5000 lb. each.....	37 1/2
Gears, machine molded.....	•	Weighting over 5000 lb. each.....	47 1/2
Gears, railway motor.....	•	Rolls, hollow crusher.....	15
Grizzly bars.....	42 1/2	Roller tires.....	30
Guide brackets, crane.....	7 1/2	Rolling mill miscellaneous.....	47 1/2
Hammer rams.....	47 1/2	Roping and jacking castings:	
Handhole covers.....	30	In lots of 1 to 49 pieces.....	45
Handhole frames.....	30	In lots of 50 to 99 pieces.....	50
Header castings.....	15	In lots of 100 to 249 pieces.....	55
Heads, hydraulic press.....	47 1/2	In lots of 250 to 499 pieces.....	60
Hollow shafts.....	7 1/2	In lots of 500 to 999 pieces.....	65
Hollow stems.....	7 1/2	In lots of 1,000 and over.....	70
Hopper, bumper.....	7 1/2	Scraper plates.....	35
Hopper castings.....	37 1/2	Sheave guards.....	7 1/2
Housings, pinion.....	50	Sheave wheels:	
Housings, roll.....	50	In lots of 1 to 49 pieces.....	30
Housings, sugar mill.....	50	In lots of 50 to 99 pieces.....	35
Hydraulic fittings.....	30	In lots of 100 and over.....	40
Hydraulic press, miscellaneous.....	37 1/2	Side bearings:	
Industrial car miscellaneous:		In lots of 1 to 49 pieces.....	47 1/2
In lots of 1 to 49 pieces.....	32 1/2	In lots of 50 to 99 pieces.....	52 1/2
In lots of 50 to 99 pieces.....	37 1/2	In lots of 100 to 249 pieces.....	57 1/2
In lots of 100 to 249 pieces.....	42 1/2	In lots of 250 to 499 pieces.....	62 1/2
In lots of 250 to 499 pieces.....	47 1/2	In lots of 500 to 999 pieces.....	67 1/2
In lots of 500 and over.....	52 1/2	In lots of 1,000 and over.....	72 1/2
Jaw crusher frames.....	35	Slag molds.....	42 1/2
Journal box wedges (cored):		Slag pots.....	37 1/2
In lots of 1 to 49 pieces.....	50	Smelting plant miscellaneous.....	37 1/2
In lots of 50 to 99 pieces.....	55	Snowplow castings.....	•
In lots of 100 to 249 pieces.....	60	Spindles, hollow.....	37 1/2
In lots of 250 to 499 pieces.....	65	Spindles, solid.....	30
In lots of 500 to 999 pieces.....	70	Sprockets:	
In lots of 1,000 and over.....	75	In lots of 1 to 49 pieces.....	30
Journal box wedges (solid):		In lots of 50 to 99 pieces.....	35
In lots of 1 to 49 pieces.....	55	In lots of 100 and over.....	40
In lots of 50 to 99 pieces.....	60	Steam piping.....	15
In lots of 100 to 249 pieces.....	65	Steam separators.....	•
In lots of 250 to 499 pieces.....	70	Steam shovel castings.....	15
In lots of 500 to 999 pieces.....	75	Steam traps.....	•
In lots of 1,000 and over.....	80	Stern frames for merchant ships:	
Journal boxes.....	•	When cast in one piece.....	20
Ladies, copper.....	27 1/2	When cast in more than one piece.....	30
Ladies, slag.....	27 1/2		

*Discounts on this class of work will be furnished on receipt of inquiry and drawings showing the castings desired.

†Net prices on machine work will be quoted on application.

Discount,
Per Cent

Striking castings with center sill connections or front draft lugs combined:	
In lots of 1 to 49 pieces.....	32 1/2
In lots of 50 to 99 pieces.....	37 1/2
In lots of 100 to 249 pieces.....	42 1/2
In lots of 250 to 499 pieces.....	47 1/2
In lots of 500 to 999 pieces.....	52 1/2
In lots of 1,000 and over.....	57 1/2
Striking castings (plain):	
In lots of 1 to 49 pieces.....	42 1/2
In lots of 50 to 99 pieces.....	47 1/2
In lots of 100 to 249 pieces.....	52 1/2
In lots of 250 to 499 pieces.....	57 1/2
In lots of 500 to 999 pieces.....	62 1/2
In lots of 1,000 and over.....	67 1/2
Stripper sleeves.....	7 1/2
Stripper rams.....	7 1/2
Sugar mill couplings.....	52 1/2
Sugar mill miscellaneous.....	37 1/2
Table rollers.....	37 1/2
Toggle plates.....	35
Trolley frames.....	7 1/2
Truck castings, crane.....	17 1/2
Truck columns, "box" section:	
In lots of 1 to 49 pieces.....	35
In lots of 50 to 99 pieces.....	40
In lots of 100 to 249 pieces.....	45
In lots of 250 to 499 pieces.....	50
In lots of 500 to 999 pieces.....	55
In lots of 1,000 and over.....	60
Truck columns, "U" section:	
In lots of 1 to 49 pieces.....	40
In lots of 50 to 99 pieces.....	45
In lots of 100 to 249 pieces.....	50
In lots of 250 to 499 pieces.....	55
In lots of 500 to 999 pieces.....	60
In lots of 1,000 and over.....	65
Tuyere castings.....	37 1/2
Valve bodies.....	30
Valve castings.....	30
Web, crank.....	45
Wheel centers, driving.....	47 1/2
Wheels, mine car of irregular design (self-oilers); special flanges, treads or hubs; ribs on web, etc.:	
In lots of 1 to 49 pieces.....	27 1/2
In lots of 50 to 99 pieces.....	32 1/2
In lots of 100 to 249 pieces.....	37 1/2
In lots of 250 to 499 pieces.....	42 1/2
In lots of 500 and over.....	47 1/2
Wheels, mine car with single flange, spoke center and plain hub:	
In lots of 1 to 49 pieces.....	32 1/2
In lots of 50 to 99 pieces.....	37 1/2
In lots of 100 to 249 pieces.....	42 1/2
In lots of 250 to 499 pieces.....	47 1/2
In lots of 500 and over.....	52 1/2
Wheels, mine car with single flange, web plate and plain hub:	
In lots of 1 to 49 pieces.....	37 1/2
In lots of 50 to 99 pieces.....	42 1/2
In lots of 100 to 249 pieces.....	47 1/2
In lots of 250 to 499 pieces.....	52 1/2
In lots of 500 and over.....	57 1/2
Worms:	
In lots of 1 to 49 pieces.....	30
In lots of 50 to 99 pieces.....	35
In lots of 100 and over.....	40
Worm wheels:	
In lots of 1 to 49 pieces.....	30
In lots of 50 to 99 pieces.....	35
In lots of 100 and over.....	40

Ship Equipment to Be Sold

WASHINGTON, April 4.—The entire holdings of the Emergency Fleet Corporation, at the plant of the Merchant Shipbuilding Corporation, Bristol, Pa., will be offered for auction April 24, 25, 26 and 27. The sale is to take place on the ground under the auspices of the Samuel T. Freeman Co., Philadelphia. Among the holdings to be sold are: power plant equipment, compressors, condensers, exciters, boilers, etc.; complete five large gantry cranes, electrical equipment and maintenance tools. There will be no more sales by negotiation of small storehouse articles, and sales of the larger items of plant and property will be discontinued within the next two or three weeks in order to enable the auctioneers to have ample opportunity to prepare the materials for the block. Due to the desire of the Fleet Corporation to liquidate its holdings at Harriman, Pa., this sale will include everything.

Freyr Brassert & Co., Chicago, have been retained by the Trumbull-Cliffs Furnace Co., Warren, Ohio, in connection with extensions to the electrical power output at the Warren blast furnace plant. They have also been engaged as consultants in concentration and mill tests on low grade magnetic ores by the Kailan Mining Administration, China, in the electrification of that company's rolling mills.

ORE REDUCTION SUSPENDED

Interstate Commerce Commission Acts as to Ex-Lake and Eastern Shipments

WASHINGTON, April 4.—Tariffs proposing reductions in freight rates on ex-lake and on Eastern "local" ores were suspended by an order entered last Friday by the Interstate Commerce Commission. The tariffs proposing cuts in ex-lake rates had been filed to become effective April 17. These schedules proposed a reduction of 20 per cent both in rates and in handling charges. The tariffs relating to Eastern ore rates had been filed to become effective April 1, and they proposed a reduction of 28 per cent. The tariffs in both cases were suspended until July 30.

The order of suspension of the commission was followed by an arrangement to consolidate these cases with a complaint filed by Buffalo iron and steel makers against reductions in ore rates, and a hearing is to begin in Washington on April 24. Unless the commission in its forthcoming decision in connection with its general rate case or by some other action in the meantime reduces these rates, the ore shipping season, now about ready to open, will find iron and steel makers paying the same high freight rates that went into effect on Aug. 26, 1920. It has been pointed out that consumers will ship as little as possible pending a final decision on ore rates. They are in a position, it is stated, to limit shipments both by reason of supplies of ore they have on hand and because of the restricted blast furnace operations. Ore producers have been awaiting the clearing up of the rate situation before quoting prices for the 1922 season.

The suspended schedules proposing reduced rates on iron ore, between points in trunk line territory and also on ex-lake iron ore are illustrated by the following table:

Rates in Cents Per 2240 Lb.

From	To	Present	Proposed
Port Henry, N. Y.	Bethlehem, Pa.	\$2.80	\$2.01 1/2
Wharton, N. J.	Pencoyd, Pa.	1.96	1.41
Hibernia, N. J.	Sparrows Point, Md.	2.80	2.01 1/2
Lower Lake Erie ports	Pittsburgh	1.27 1/2	1.02

Proposed Export Tariffs Suspended

WASHINGTON, April 4.—At the same time it entered an order last Friday suspending tariffs reducing iron ore rates, the Interstate Commerce Commission entered another order suspending until July 30 tariffs proposing increases in export rates on iron and steel articles from Central Freight Association territory to Texas Gulf ports. On Saturday this action was followed by suspending also till July 30 tariffs proposing increases and readjustments in commodity rates on iron and steel between Mississippi River points, Memphis, Tenn., and south thereof and grouped points on the one hand, and Missouri River and related points and points in western trunk line territory on the other. These rates were included in what the trade knows as the Mississippi Valley case, and the increased rates were to have become effective on April 1. Typical examples of the present and proposed rates were stated on page 898 of THE IRON AGE of March 30. It is understood that the suspensions were ordered because the tariffs did not comply with the orders of the commission in its decisions in the Mississippi Valley case, which were handed down in two parts, one being rendered last October and the other last December. It is said that the rates were out of line in some instances and that among other things the proposed rates from Central Freight Association territory to Texas Gulf ports for export, proposing rates the same as the domestic rates from the same territory to New Orleans, discriminated against Galveston, Tex.

The interests held by C. T. Parker under the name of the Elan Engine Co., Lansing, Mich., have been sold to Arthur R. Sawyer and Verne H. Church, both of Lansing, who will conduct the business in future.

Foundry Methods in Making Car Wheels

Charging and Handling of Cupolas—Material Handling to
Save Labor—Sand Preparation—Core
Making and Baking

BY GILBERT L. LACHER

(Concluded from page 851, March 30)

IN the leading article last week the main features of handling molds to reduce labor cost and remove causes of heavy labor turnover in a new car wheel plant were described. Details of many of the regular foundry operations are given herewith. The plant under review is that, at Council Bluffs, Iowa, of the Griffin Wheel Co., Chicago. This, the newest of the ten plants of the company, embodies revolutionary methods in mold handling and is expected to reduce production costs materially.

The foundry has two large cupolas, one for each of the converse halves of the molding room. The shell has an outside diameter of 102 in. except in the combustion zone, where it bulges out to 120 in. The inte-

At present only one cupola is in operation and about 120 tons of iron is charged per day, but with full output from 180 to 185 tons can be charged into each cupola, or a total of 360 to 370 tons daily. Approximately 87 per cent of the charge goes into the finished car wheels, 11 per cent is returned to the cupola for remelting and 2 per cent is lost.

Of the returned scrap, the headers, gates, sprues, etc., which are dropped through the shake-out floor, are conveyed by industrial narrow-gage cars through a tunnel which runs under the middle of the molding room into the raw material storage yard. Scrap is also reclaimed from the refuse dropped from the bottom of the cupola every night. This refuse is loaded



To the Left of the Suspended Magnet Are the Two Inclosed Car Wheel Breakers. On the right leg of the gantry crane is the scale which weighs the iron before it is discharged into the buggies below. One loaded buggy shown is being hoisted to the charging floor

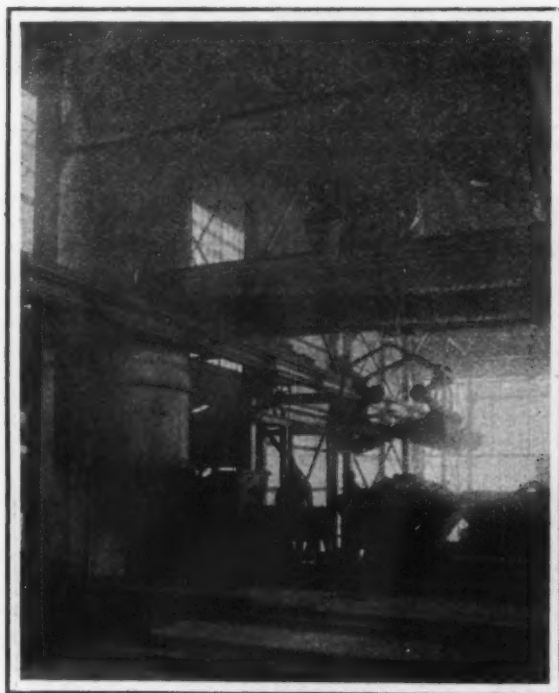
rior diameter is 84 in. throughout the entire length. The provision for an extra thickness of lining in the combustion zone, a new departure in cupola design, is calculated to prevent any possibility of the charge burning through the shell. Blast is supplied to the cupola via bustle pipe through eight tuyeres at the rate of 9000 cu. ft. per min. A gate valve in the air main permits of the shutting off of one cupola or the operation of both simultaneously. Air connections make it possible to isolate any tuyere to ascertain how uniformly it is taking the blast. These connections lead to a flowmeter, made by the Bacharach Industrial Instrument Co., Pittsburgh, which is calibrated up to 12,000 cu. ft. per min., and which may be used to test any one of the 16 tuyeres. Regulation of the cupolas is further facilitated by a Bristol pressure gage, which records the air pressure at all times.

on narrow-gage cars which are hoisted by overhead crane to the cupola charging floor, where they are discharged through a trap door into a chute leading to a water mill. In this mill practically all elements in the drop except the iron are washed out, and the scrap thus recovered is remelted in the cupola.

In lighting up a cupola, an oil burner is used for igniting the straw and kindling. A small blower supplies draft until combustion is well started, when blast from the large blowers is turned on. The charge contains a heavy proportion of iron, running as high as 12,000 lb. of iron to 1300 lb. of coke. A typical charge of iron consists of 60 per cent old wheels, 10 per cent purchased scrap, 10 per cent returned scrap, and 20 per cent pig iron. These proportions, however, vary according to the relative prices of old car wheels, purchased scrap and pig iron.

The charging floor is $31\frac{1}{2}$ ft. above the level of the molding room. Operating on a track extending the entire length of the floor, the motor-driven charging car gets its power from a trolley. Back of this track, at an elevation of $5\frac{1}{2}$ ft., a platform containing tracks running at right angles to that carrying the charging car is used for storage of narrow-gage buggies containing old car wheels, pig iron, scrap and coke. The buggies are hoisted from the raw material yard below by a 5-ton Milwaukee Electric overhead traveling crane. To facilitate the transfer of the buggies the crane span overlaps the material yard by 11 ft. The old car wheels, pig iron and scrap are weighed before they leave the yard, while the coke is weighed on the charging floor, three 6000-lb. Fairbanks scales being used.

From the charging floor storage tracks the buggies are run directly onto the platform of the charging car, which has two tracks and thus can take two buggies at one time. For charging, the car is run in front of one of the cupolas and the platform then moved forward by rack and pinion so that it overhangs the edge of the charging door. The platform is then me-



Buggies of Metal and of Coke Are Transferred from the Storage Tracks to the Charging Car Platform and Thence Emptied into the Cupolas

chanically tilted, thereby discharging the contents of the buggy, which is held fast by dogs fastened against the axle nearest the cupola. It will be noted from the illustration that each cupola is open around its entire circumference at the charging level, the cupola stack being suspended from the steel work above. There is no charging door in the sense that the cupola may be closed up, a large rectangular opening having been provided to receive the contents of the discharging buggies.

Flexibility in material handling is assured through the provision of a hydraulic elevator, which may be used to raise coke and iron to the charging floor level in the event of a breakdown of the overhead crane.

The facilities provided for the storage and handling of raw materials are worthy of particular note. A railroad track elevated 11 ft. above the floor, and carried on concrete bents, passes over coke and sand bins located on both sides of the cupola house. Thus the contents of incoming cars are dumped into the bins below. As the bins are inclosed within the walls of the plant, their contents are protected from the elements. The coke bin is commanded by the charging floor crane and at the same time is served by industrial track connecting with the cupola house elevator—an

alternative method of conveying coke to the charging floor. The molding sand bin is also served by the charging floor crane and at the same time by a 3-ton crane in the molding room, while the core sand bin connects with a tunnel through which industrial cars convey the sand to the core room. The coke bin has a capacity of 500 tons, while the molding sand and core sand bins hold 1200 and 600 tons respectively.

The old car wheel and pig iron storage yard, just beyond the end of the cupola house, is 75 ft. wide and is spanned by a 5-ton gantry crane, 46 ft. between crane rails and constructed by the Milwaukee Electric Crane & Mfg. Co. On one side of the yard the crane bridge extends over a second railroad track, on which cars of old wheels are brought in for unloading by magnet. On the other side the bridge is itself overlapped 11 ft. by the charging floor crane, as noted before. The floor of the yard is $5\frac{1}{2}$ ft. below the level of the molding room floor.

For breaking old car wheels, two mechanical drops of novel design are located on a platform adjacent to the railroad siding, and covered by small shelters to protect the operators in cold weather. Wheels are rolled into the drop houses by hand, and are then laid flat and shoved under the wheel breaker by a hydraulic pusher. The wheel is broken by the impact of a 6000-lb. weight raised hydraulically to a height of 4 ft., whence it is dropped, developing 24,000 ft.-lb. The breaker is entirely inclosed after each wheel is inserted, to avoid danger of injury to employees from flying pieces. The broken pieces are forced out of the breaker by the succeeding wheel as it is pushed in. To withstand the impact of the weight, an anvil consisting of six rings of cast iron, weighing 15 tons, has been superimposed upon a concrete foundation.

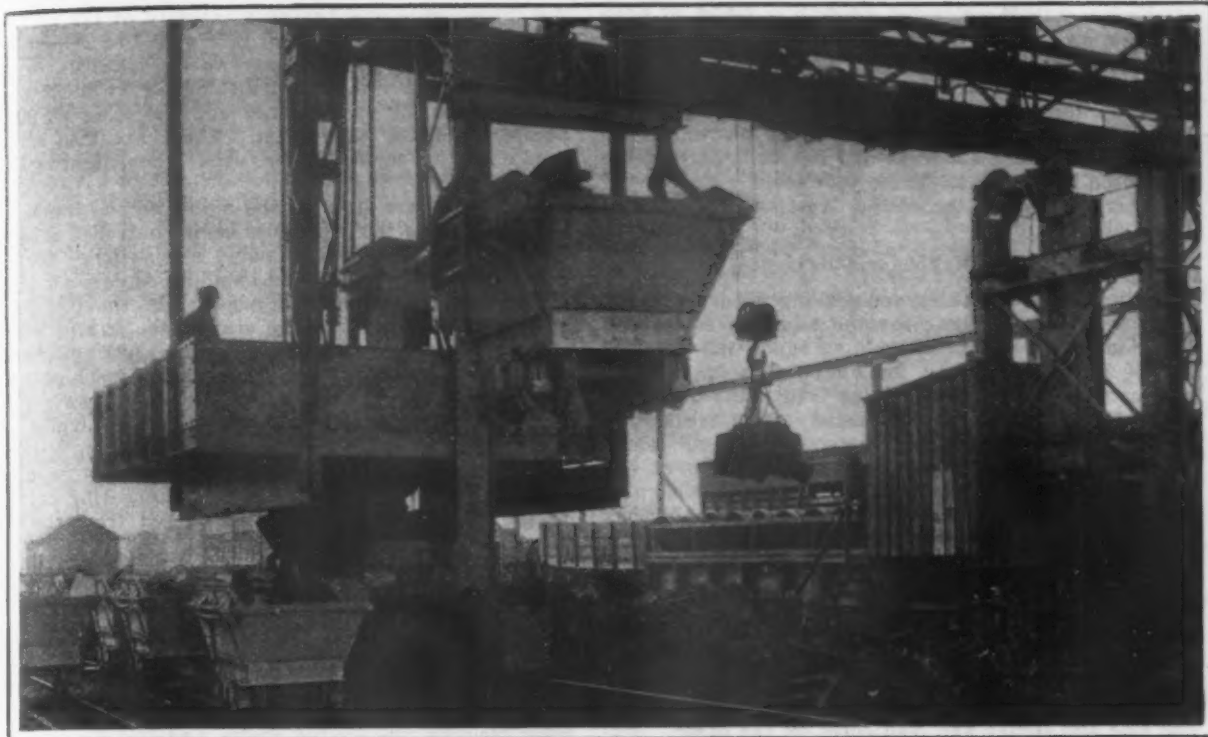
The broken pieces are transferred by magnet to a 10,000-lb. capacity Toledo scale mounted on the carriage of the gantry crane. After weighing, the iron is passed by chute into buggies which are hoisted by the charging floor crane to the cupola storage tracks. The section of the storage yard in which the broken wheels are handled is sheltered by a roof which extends from the cupola house over the railroad siding. For weighing incoming cars of old wheels a 150-ton Fairbanks track scale and house have been provided.

Sand Handling by Machinery

Mechanical equipment provided for handling the sand in the molding room is as well planned as that devised for molding and handling the iron. The sand, shaken out from the molds through the shake-out grates, drops on a reciprocating conveyor which mixes it, aerates it, sifts it and moves it forward to the boot of a bucket elevator, which hoists it into a 60-ton storage bin. The reciprocating movement is accomplished by a long frame which, suspended over the conveyor, is actuated to and fro by a large motor-driven wheel crank. The frame is equipped with lips which are positive in the forward movement and idle in the return movement, thus advancing the sand when moving forward and mixing it when dragging over it on the return stroke. Midway between the two ends of the conveyor is a revolving screen, into which the sand is carried by bucket elevator. This screen removes the coke, iron and other impurities and sifts the sand onto the conveyor again, to be carried to the bucket elevator serving the storage bin.

One part of new sand to 16 of floor sand is introduced into the storage hopper, the new molding sand being conveyed by 3-ton overhead traveling crane from the new sand bin, located on the other side of the molding room. A feeder cutter, operated by cams on a chain belt, reciprocates back and forth across the outlet of the storage hopper, breaking up any lumps of sand which may have packed together and distributing it evenly on a belt conveyor below. The latter carries the sand to the four molding sand storage hoppers, located above the molding machines.

There are also four facing sand hoppers—one for each molding machine—served by the same belt conveyor. These hoppers are filled once a day, the facing sand being made by mixing seven parts of old molding sand to one part of sea coal. This material is deposited



Broken Wheels Are Hoisted by Magnet from the Base of the Breaker, at Right, Weighed on the Crane Scale and Then Chuted to Charging Buggies on the Track at Left

in a motor-driven mixer from which it is passed into the facing sand storage bin, adjacent to the molding sand storage hopper. Whenever facing sand is to be carried to the hoppers serving the molding machines, sand is passed by gravity from the storage bin to the belt conveyor, the outlet of the molding sand storage hopper remaining closed during that period.

The sea coal used in the facing sand is pulverized by a grinder located adjacent to the railroad siding which passes through the cupola building, where the coal may be handled direct from railroad cars by

the charging floor crane. The grinder, made by the Williams Patent Crusher & Pulverizer Co., St. Louis, will grind enough coal in a half day to last the foundry a month. As it is pulverized, the coal is deposited in a storage hopper with a capacity of one carload, from which it is drawn into industrial cars and moved down an elevated track which extends the whole length of one end of the molding room. From this track the contents of the industrial car are dropped into a concrete storage bin, access to which is gained from the molding room through a hatch in the roof of the bin.



While Dumping Charge into Cupola, the Buggy Is Held to the Rails by Retaining Brackets. The buggy is kept on the end of the platform by stop dogs, which engage the axle nearest the cupola

Underneath the elevated track is a series of open bins inclosed by woven wire fence, in which other foundry materials are stored, such as the graphite heads, brick stopper sleeves and nozzle seats which make up the stoppers used in all the pouring ladles, the anthracite coal dust and cylinder oil which are made into a paste for swabbing the chillers, and the flour used in the cores. These supplies are transferred by gravity through the chutes from the cars on the track above.

Core Making and Baking

Adjoining the cleaning and soaking pit departments is the core room. The core sand handling equipment, like that provided for the molding sand, was designed by the C. O. Bartlett & Snow Co., Cleveland. New core sand brought by tunnel car from the storage bin and old core sand from the cleaning room are hoisted by bucket elevator to a revolving screen, through which they are passed into two $7\frac{1}{2}$ -ton storage hoppers, one for old and the other for new sand. From the hoppers the old and new sand are drawn into a measuring box set for the proper proportions of each, desired in the mixture. Here also a measure of flour is introduced. The sand is then passed through a mixer to a continuous belt conveyor, which carries it to a hopper serving the core benches. The proportion of new to old sand in the mixture is approximately four to one.

Core benches are arranged on both sides of the sand hopper serving them, pan cores being made on one side and center and dish cores on the other. Machines are used in making the cores, the sand being drawn from the hopper into molds and the ramming being accomplished by pneumatic piston. As a safety precaution, the arrangement is such that the operator must turn two levers simultaneously, thereby occupying both of his hands, before the ramming will start. After the cores are made, they are put in a black wash and then transferred to rack cars. An hydraulic elevator situated in the track adjacent to the pan core bench relieves the core maker of the necessity of lifting up the cores when placing them on the rack. Thus, when a rack car is to be loaded, the car is lowered so that the top rack is at the same level as the core bench. When that rack has been filled; the elevator is raised so that the next rack is at the bench level, and this operation is repeated until the car has been loaded. The rack car tracks are connected at right angles with transfer tracks, which likewise connect at right angles with a track passing through the core oven.

Constructed by the Young Brothers Co., Detroit, the core oven commands particular attention because it is heated by electricity. It consists of three compartments—for preheating, heating and cooling. Heated air is drawn from the cooling pits into either the preheating or heating chamber; hence it is necessary to use the current only to heat above the hot air temperature, which averages 300 deg. Fahr. The walls of the oven consist of 4 in. of Silocel insulating brick, covered with steel sheets. With this insulation the heat loss is small, despite the fact that the doors of the chambers must be raised and lowered repeatedly as the rack cars are advanced. The oven has a Leeds & Northrup potentiometer temperature recorder which, after being set for any temperature desired in the oven, regulates itself.

The machine shop, which adjoins one end of the cleaning room, is used not only for turning the various flask parts, but also for mounting wheels on axles when orders require it. Ordinarily, however, this work is done by the railroads themselves. Among the important machines in the shop are a 25-in., heavy-duty engine lathe, an axle lathe, a wheel press, a wheel centering machine, a 30-in. planer, a 28 x 32-in. drilling machine, two car wheel boring machines, a 32-in. turret mill, a 4-ft. radial drill, and a 62-in. boring mill. Adjacent to the machine shop are the pattern shop, the store room, the electrician's workshop, the blacksmith shop and the power room.

Equipment in the power room includes a General Electric Co. 125-kw. motor-generator set, two motor-driven blowers made by the Connersville Blower Co., which operate at 200 r.p.m., driving 45 cu. ft. of air per revolution; two motor-driven pumps developing

250 lb. pressure and having a capacity of 125 gal. per min., furnished by the Aldrich Pump Co., Allentown, Pa.; a 350-gal. accumulator, two Sullivan Machinery Co. air compressors, one furnishing air at 80 lb. pressure for the jolting machines and the other at 20 lb. pressure for the sand blast. There are also an oil pump and a small blower used when lighting the cupola.

Here also are situated the main control panels for the plant, all of the main lines being controlled through oil switches. On the a.c. panel are switches for the core oven, power room, sand handling equipment, molding machines and machine shop. On the d.c. panel are switches for the bridge cranes, the gantry crane, charging machine, shake-out crane, pitting cranes, charging floor crane, hot iron cranes, machine shop annex and core room cranes. One main switch, as well as individual switches, have been provided for the lighting circuits, which are on alternating current. There are three 150-kw. transformers, in a separate house, which step down 13,000-volt alternating current to 440 volts. The power is purchased from the Nebraska Power Co., Omaha.

In a separate building, connected by a covered passageway with the molding room, are housed a toilet and wash room, a locker room and a boiler room. The sanitary equipment is of the best and individual steel lockers have been provided for the men. The floor of the locker and toilet rooms is of concrete, the frequent flushing of which insures cleanliness. The boiler room includes two United States Radiator Corporation boilers used for heating the machine shop and the toilet room, and also a stove for heating the bath water for the showers in the wash room. Each boiler has a rating of 7500 sq. ft. of radiation, which is ample to take care of considerable plant expansion, there being only 8000 sq. ft. of radiation in the entire works at present. Oil supply is stored in a 12,000-gal. underground tank, next to one of the railroad sidings.

Noteworthy because of its substantial construction and the completeness of its equipment, the office building has an exterior of high-grade pressed brick and floors of concrete. Windows on all four sides assure the best of light. Private offices have been set aside for the superintendent, the inspector and the cashier, and there are also separate rooms for the accounting department, the dispensary and the files. Two well-appointed toilet rooms complete the floor plan. Attached to the building is a small clock house, through which foundry employees pass to and from work.

For an industrial plant the Griffin foundry is most impressive. With side walls of concrete, continuous sash and plaster, and roof of red tile, it presents a pleasing, finished appearance rarely found in foundry architecture. The frame of the building is of structural steel and the roof construction is a departure from standard design. The four bays containing the major portion of the plant have duplicate continuous monitors designed by the company's engineering staff. These monitors have sloping sides which provide large glass area and uniform light. For the monitors alone there is an average of 1 sq. ft. of glass area to 4.36 sq. ft. of floor space, while in the side walls 1 sq. ft. of glass has been provided for every 4.83 sq. ft. of floor area. Taking the side walls and monitors together, the floor area per square foot of glass is 2.3 sq. ft. Under the plan of the plant, which gives each department the benefit of the light from one or more monitors, well-distributed illumination is insured.

Not only a maximum of illumination, but a maximum of economy in construction, both from the standpoint of fabrication and the amount of steel required, are embodied in the monitor design. The identical construction of the monitors and the 50 roof trusses in the four main bays simplified the work of the fabricator. At the same time, the design called for a minimum of structural steel, only 13 lb. per sq. ft. of floor space being required to support the entire roof of the main foundry building.

The entire structure is covered with Federal Cement Tile Co. tile, the main building having red pitch tile, while the roof over the cupola house, drop shelter shed and shipping platform is flat tile, over which a layer of composition roofing was superimposed. Five

ventilators have been provided in the molding room roof, over the bull ladles. Fenestra steel sash was furnished by the Detroit Steel Products Co., while for the magnesite plaster walls Hy-rib expanded metal lath was provided by the Truscon Steel Co., Youngstown, Ohio. The structural steel was fabricated by the Omaha Steel Works.

All bays of the building on an east and west line are 22 ft. centers; on the north and south line, the first four bays are 70 ft. each; the cupola building, 44 ft., and the drop shelter shed, 75 ft. The total area covered by the plant is 2.55 acres, the largest department of which is the molding room, containing 32,860 ft.

Site Conditions Dictated Floor Elevations

The plant is located in the alluvial land of the Missouri River bottoms, where, during extreme high water, the sub-surface seepage rises to within 4 ft. of the surface. As the soil was found to have a greater carrying capacity near the surface than at a greater depth, the molding and core rooms were elevated $5\frac{1}{2}$ ft. and all other departments $7\frac{1}{2}$ ft. above grade. To accomplish this, 15,000 cu. yd. were excavated from the yard space on the east and west sides of the plant, putting the molding and core rooms 8 ft. and the other departments 10 ft. above the level of the excavated portion. Thus ample space has been provided for the dumping of refuse, the disposal of which is ordinarily a source of considerable expense to a foundry.

The elevation of the plant also insured freedom from moisture in the soaking pits and the various raw material storage bins. The foundations of the plant, of reinforced concrete, were put in near the surface of the ground. The concrete walls rise $3\frac{1}{2}$ ft. above the floor level of the molding room and above the concrete is the continuous steel sash. Underground passageways of reinforced concrete connect the sand bins, molding and core sand handling equipment, cleaning room, core room and scrap storage yard.

The site of the plant, an L-shaped tract containing 19 acres, is particularly well chosen from the point of view of transportation facilities. A siding from the Union Pacific gives the plant connections with seven other roads within a distance of one mile. The siding has three branches, one of which is elevated above the coke and sand storage bins, another serving the old wheel storage yard and the third the shipping platform. It is to be noted that the elevation of the cleaning room floor level above that of the molding room facilitates the handling of shipments, as it permits wheels to be rolled directly into cars without hoisting. The shipping platform extends the whole length of the cleaning room, in which numerous doors have been provided to avoid unnecessary steps in transferring wheels to cars. The platform also extends across one end of the cleaning room and along one side and across one end of the machine shop. In the latter case the platform is for the handling of wheels which have been mounted on axles, which are transferred to gondola cars by a chain hoist suspended over the track.

The Griffin Wheel Co. acted as general contractor in the construction of the entire plant. The buildings and much of the equipment, including the molding machines, the mold conveying system, shake-out crane, cupolas, charging machine and sand blast, were designed under the supervision of Frederick K. Vial, chief engineer of the company and consulting engineer for the Association of Manufacturers of Chilled Car Wheels.

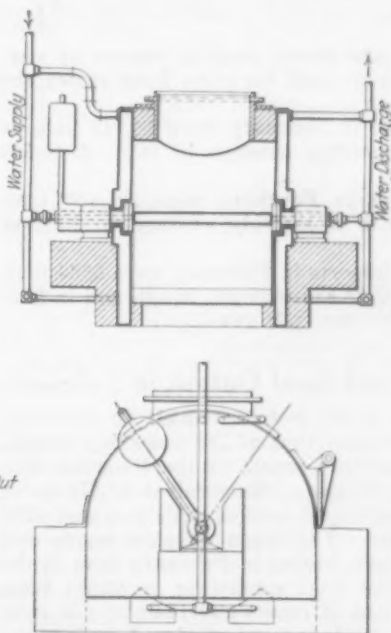
Although the foundry has been in operation only a short time, its manufacturing costs are already below those of most other Griffin plants. This is to be accounted for not only by the arrangement of the various departments and the material handling equipment, but more particularly by the successful substitution of machines for molding skill. A two per cent loss of wheels produced is considered low in a plant where molding is done manually. But at Council Bluffs mechanical methods have already reduced the loss to four or five wheels per thousand, and it is expected that this average will be improved upon as the men become more experienced. At the same time, greater uniformity in the product has been made possible through the more uniform ramming of the molds which the machines insure. A monument to American engineering genius, the Council Bluffs foundry marks a great step forward in wheel molding practice and heralds another signal victory of brain over brawn in the field of industry.

Reversing Valve for Regenerative Furnaces

Designed for metallurgical furnaces, a new air and gas valve, recently put on the market by the W. R.

Miller Co., Pittsburgh, has some features of interest. The drawing gives a clear idea of its construction. The flapper and the wall plates are of welded steel, water filled. The bottom seal, resting on the brick walls, can either be a casting for air circulation or welded steel, water filled, the latter preferred.

The reversing lever, for either hand or power operation, can have a small attached motor for large valves, while the smaller valves can be actuated by any operating rigging. The lever



Sections and Elevation of the Valve, Showing Path of Gases and Location of Cooling Water Pipes

rests against wood or other material acting as a cushion. Access to the interior of the valve, when replacement is required, is easy. The company refers to this new design of valve as being simple of construction, requiring only a small amount of space to install, and of low installation cost.

Effective April 1 an extra spell-hand was added to sheet mill crews in union mills operating under the wage agreement of the Amalgamated Association of Iron, Steel and Tin Workers. This hand is to assist the catcher, doubler and matcher and under the terms of the agreement is to work during the six months' period from April 1 to Oct. 1. He is dispensed with during the rest of the year. The extra hand is added during the warmer months of the year because of the greater strain to which hot mill crew members are subjected during this period.

BRITISH FOREIGN TRADE

February Steel Exports in Good Volume—Imports Lowest Since April, 1920

The February official returns of British foreign trade in steel and iron show that the total exports were 228,370 gross tons which contrasts with 261,119 tons in January. This is the first month since July, 1921, which has shown any decline from the previous month. In February, 1921, the total was 167,158 tons. The February imports were 77,270 tons, the smallest in many months. It is necessary to go back to April, 1920, to find import figures as low; in that month they were 71,161 tons. In February, 1921, the imports were 191,565. The following table shows comparative data:

British Steel Exports and Imports, Gross Tons

	Exports	Imports
October, 1921.....	161,683	189,536
November, 1921.....	202,059	184,064
December, 1921.....	211,314	132,463
January, 1922.....	261,119	100,178
February, 1922.....	228,370	77,270
Average per month, 1919.....	188,519	50,801
Average per month, 1920.....	274,881	128,685
Average per month, 1921.....	144,885	152,734
Average per month, 1913.....	420,757	195,264

The trend of some of the principal exports is shown by the following data:

Principal British Exports, Gross Tons

	Average Per Month		February	
	1913	1921	1921	1922
Pig iron	78,771	8,602	11,833	35,382
Steel rails	41,676	14,698	15,337	18,173
Steel plates	11,162	10,673	23,060	6,624
Galvanized sheets	63,506	17,635	8,017	37,795
Steel bars	20,921	8,927	13,642	10,655
Tin plates	41,208	18,873	21,518	34,802
Black plates	5,679	1,178	830	4,021
Steel sheets			4,334	10,686

As in January and recent months, exports of steel rails, galvanized sheets and tin plate have shown the most marked recovery.

Pig iron imports in February were 16,945 tons as compared with a monthly average in 1921 of 55,564 tons.

Iron ore imports in February were 225,939 tons, which compares with a monthly average in 1921 of 157,298 tons.

Manganese ore imports in February were 6884 tons. Last year they were 14,405 tons per month and in 1913 they were over 50,000 tons per month.

Canadian Iron and Steel Output in February

The production of pig iron in Canada in February was slightly larger than that of the preceding month, according to the monthly report of the Dominion Bureau of Statistics, Ottawa. The total of 33,572 gross tons was made up of 25,400 tons of basic iron and 8172 tons of foundry iron. The output of steel ingots and castings was 9000 tons higher in February than in the preceding month, the total amounting to 42,388 tons, comprising 40,939 tons of ingots and 1449 tons of steel castings. Electric steel castings produced during the month totalled 772 tons, as compared with 856 tons in January.

Re-exporting at Cuban Ports

WASHINGTON, April 4.—Protest has been made by this Government through the American legation at Havana against the abridgment of privileges previously granted for the re-export and clearance of undelivered goods at Cuban ports. The invoice value of the aggregate merchandise affected is estimated at over \$16,000,000, much of which is American and consisting of machinery, textiles, leather goods, and general merchandise. The extension of time that had been granted by the Cuban Government for the re-export of these goods was curtailed by a new presidential decree promulgated on March 23. The present action revokes the privilege of further re-export to the port of origin without the payment of customs duties which had been previously granted to such foreign goods as had been entered for consumption but not yet cleared through the Cuban customs. The decree also provides

that the period allowed for the withdrawal of goods now held in bonded warehouses, after the payment of charges, shall expire June 30, after which such uncleared merchandise as has been stored in a bonded warehouse for over six months may be sold by the Cuban authorities for the payment of duties. The protest is based on the ground that, inasmuch as no adequate inventory to show the exact location of particular parcels has been available, it has not been possible thus far for merchants to take advantage of the privileges extended by the previous decrees to either remove the goods or reshipe them.

American Car Builders Compete with Others in Argentina

WASHINGTON, April 4.—Active competition of American car builders in the markets of the world and their ability to meet prices of foreign makers was reflected in the recent opening of bids on 650 freight cars required by the Argentine State Railways, according to a report which has been made to the Department of Commerce by Commercial Attaché Feely at Buenos Ayres. Of four bidders, including Belgian, American, British and German, the Belgian figures were the lowest, while the American bids ranged a close second, being only 7 per cent over the Belgian bid. This is all the more remarkable when consideration is given to the handicap of an adverse conversion rate. The American offer of 1,160,000 gold pesos was based on an exchange rate of 1.22 gold pesos per United States dollar, which is more than 17 per cent above par. The Belgian bid was 1,080,000 gold pesos, while the British bid was 2,000,000 gold pesos and the German bid 2,480,000 gold pesos. All tenders were made against the same specifications.

The minimum time for payment was fixed at three years and bidders were instructed to say whether they would be willing to invest the proceeds in Argentine wool. These features were distinctly advantageous to the German and Belgian interests, which have been operating along these lines and inclined to eliminate American competition.

It is reasonable to expect, says the industrial machinery division of the Department of Commerce, commenting upon the bidding, that the disadvantage of unfavorable exchange rates suffered by American firms competing in Argentina will become less and less serious, as rates between New York and Buenos Ayres have been improving constantly since the low ebb of last July, when the premium on the dollar was approximately 50 per cent.

Steel Exports to South America

Structural steel exports from the United States to South America in 1920, according to a report made to the Department of Commerce, were 60,301 tons, as against 32,967 tons in 1921. Galvanized sheets exported from this country to South America in 1920 were 26,512 gross tons, while in 1921 they were 8,240 tons.

In 1921, Argentina was the leading market for bolts, nuts, screws, and hinges, and Peru for wire nails and locks. In 1920, Argentina was first in bolts, nuts, and locks, while Chile led in wire nails and Brazil in screws and hinges. Total exports of bolts, nuts, wire nails, screws, locks and hinges were valued at \$11,083,777.

The cut nail is very popular in South America. Of the total amount of cut nails exported from the United States, South America took 47 per cent in 1920 and 32 per cent in 1921. Of wood trimmings, moldings, and other house finishings, South America took 14 per cent in 1920 and 9 per cent in 1921.

"The Manufacture and Heat Treatment of Steel Springs" was the subject of an address by George P. Moore, of the Wallace Barnes Mfg. Co., Bristol, Conn., at the April meeting of the Providence (R. I.) chapter of the American Society for Steel Treating, on April 5.

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THE IRON AGE

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Money and Prices

Progress along the path of readjustment is facilitated by recognizing truths even if unpleasant. Some are old truths, merely discredited for a time. One that should now receive general recognition is that the quantity of money or negotiable securities in circulation does not regulate the general level of prices. For a time after the war it was loudly preached that it did. No serious attention, of course, need be given to the cases of the countries in which the printing presses have been active, notably Russia and Germany, where prices in paper have increased as the product of the printing presses piled up. We are thinking about real money.

Before the war, there was debate on the quantitative theory of money. Its advocates cited figures to indicate that as the volume of circulation increased, prices rose, while usually the counter argument consisted chiefly in questioning whether there was a connection. Lately the detailed study the Russell Sage Foundation has made of commodity prices in the United States has indicated that there has been no general advance in prices in a century. Instead there have been three peaks—in connection with the war of 1812 or the Napoleonic wars, our Civil War and the World War—while declines occurred after the first two, during a general period of about 30 years in each case. Almost throughout the period of more than a century, the quantity of money was increasing.

In another respect there is fresh information on this subject, since the operation of the Federal Reserve system has been observable. Since this system was established, there have been variations in the quantity of money in circulation, but the ups and downs have tended to follow rather than precede the ups and downs in prices.

Trends in prices are made by competition, which is slightly different from prices being made directly and solely by competition. Competition may be the keenest ever seen and yet not force the price of the commodity involved to anything like its record low level, on account of the competitors not being able to reduce their costs to the previous low level. There has to be a descending spiral, for in the case of practically every commodity, the cost of production depends largely

upon prices of other commodities. Beyond question the amount of competition does determine the trend. The war time increase in prices was plainly due to reduction of competition among sellers, there being rather a great deal of competition among buyers, all the way from governments down to the ordinary workman.

Repeatedly one observes men computing the percentage by which a given commodity is above its "pre-war level" and endeavoring to judge whether or not the percentage is tolerable. In many cases there is conscious or unconscious reference to the quantity of circulating medium being responsible for the difference. Such reasoning is unsound. Reference should be made rather to the items of cost which the seller cannot control.

Undoubtedly very close connection can be traced between the course of prices and the volume in which money or its representatives, in bank checks, etc., circulates. The quantity of money is one thing and the rate of flow of money a different thing. It is obvious that conditions that cause prices to advance also cause money to circulate more rapidly.

One of the influences tending to bring prices back to normal, when there has been a wide divergence, is the wealth or property of the country against a large part of which bonds or mortgages exist, expressed in dollars, the number of dollars not fluctuating like the market price of a share of stock. Very roughly speaking, this wealth is about 50 times the amount of currency outstanding, while the money transfer in a year, in checks and the handling of currency, is something like 100 times the amount of currency.

The decision of the Refractories Manufacturers' Association at its annual meeting recently in Chicago, to increase its endowment for research work, will be welcomed by steel makers, and particularly by those experimenting with the blow-torch open-hearth furnace. Among the difficulties encountered in bringing about the perfection of this style of melting unit is that of obtaining a brick for the side walls and roofs which will withstand the intense heat and the abrasive action of the gas and air blasts. Commercial brick now

available are made for temperatures of 2700 to 2800 degrees Fahr., while it often happens that in furnaces of the type referred to the temperature will rise to nearly 4000 degrees, as was brought out at the October, 1921, meeting of the American Iron and Steel Institute. This wide divergence between what brick will do and what they are now called on to do prevents attaining the full possibilities of furnaces of the McKune, Egler and other similar types. Relining is necessary at more frequent intervals than is the case with the ordinary open-hearth furnace. The end sought in these blow-torch furnaces is an increase in production through a shortening of the time from charging to tapping; but if the furnace has to be relined frequently or cannot be kept in continuous operation on one lining for as many heats as can be secured from the older type furnace, there is a considerable offset to the gain. It is claimed that an electrically sintered magnesite brick can be made which will stand up under the intense heat. Refractories makers say such a brick would be very expensive and impractical in a commercial way, but this is an opinion and is subject to revision. The matter is worthy of thorough research in view of all that may come out of it in increasing the production of steel and at the same time reducing the unit cost.

Foreign Iron Ore Favored

Producers of iron ore in Eastern States find themselves in a deplorable situation owing to the suspension by the Interstate Commerce Commission of the proposed reduction of 28 per cent in freight rates and handling charges on Eastern ores which had been filed to become effective April 1. At the same time, the proposed reduction of 20 per cent on ex-lake rates was suspended, the suspensions in both cases extending until July 30. At the same time no action was taken for the suspension of the reduced rates on foreign ore from seaboard to inland furnaces, and operators of Eastern mines declare that it would be impossible for them to compete with foreign ore. In fact, one important Eastern steel company has already contracted for a cargo of foreign ore, and it is fully expected that importations will be heavy during the next few months.

The commission announced that a hearing on the suspensions will be held in Washington, April 24, but the slowness with which such cases are disposed of leaves little ground for hoping that a decision will be reached in time to be of benefit this season to the Eastern producers. One important ore case has been pending two years. The suspensions were due to complaints filed by Buffalo iron and steel makers against reductions in ore rates unless reductions were made on coal and coke rates. There is, of course, much to be said in support of this position, but it is extremely unfortunate that a final decision as to ore rates could not be very promptly reached or that rates on foreign ore be raised, or the Buffalo interests satisfied by a prompt decision in regard to coal and coke rates.

Eastern ore producers have kept mines in operation with limited forces in order to provide employment for some of their men, and unless im-

mediate action is taken by the commission making it possible for the Eastern companies to compete with foreign ore, hundreds of men will be thrown out of employment and the companies will suffer serious financial loss.

Without assuming to pass upon the merits of the claims made by the Buffalo companies, it is perfectly clear that the recent decisions benefit foreign producers at the expense of operations at home. A way to prevent such discrimination should be found immediately.

Railroad Work by Contract

The opinion handed down by the majority of the Interstate Commerce Commission last week, regarding contracts made by railroads in the spring of 1920 with outside shops for the repair of locomotives, has brought an expression of gratification and approval from the American Federation of Labor. But when it is noted that the commission was divided by a vote of six to five, that no order was issued and that the dissenting members gave excellent reasons for their positions, there is little in the action of the commission that looks like a victory for organized labor. Several of the dissenting members held that the case was one with which the commission had nothing to do, but considering it on its merits, they justified the action of the railroads.

The majority opinion was made up largely of analyses of estimates of the number of locomotives that could be repaired within a month or two after Federal control ceased. These figures were contrasted with what actually developed after the contracts were awarded. There is no question that extensive repairs were needed and that the necessity for action was urgent. In the case of the Pennsylvania Railroad, the majority report expresses the opinion that the additional expense of \$3,000,000, due to having the work done outside, was not justified, but it adds that the imputation of an ulterior or dishonest motive is without support in the record of the case.

In separate opinions by Commissioners Potter, Lewis and Campbell, the danger and futility of criticising the action of the railroad executives are considered. Commissioner Potter was particularly emphatic in declaring that the responsibility rests with the railroads. "We should not reverse their judgment," he said, "upon a record of this late date, which in the nature of things cannot possibly give us even an outline sketch of the picture which confronted them." He added that there is never an excuse for a carrier to run any risk with respect to its motive power. If officers of the carriers did not exercise good judgment, they are responsible to the stockholders and not to the commission. This strikes right at the heart of the controversy, for if any functions are to be left to the railroad officials they must not be interfered with continually, but must be allowed to exercise their judgment to a very large extent.

One point was not developed and perhaps was not pertinent to the decision, but it is an open secret that although the action of the railroads at the time referred to in 1920 probably was not due to the position of the railroad brotherhoods, the

threat of a general strike last fall and the continued insistence upon maintaining the unreasonably high schedule of wages have driven the railroads to resort to any expedients that could be devised to curtail expense. One of these expedients has been the making of contracts, not only for repairs, but also for maintenance of way, and it seems inevitable that more contracts of this kind will be let unless the railroad employees consent to a revision of the wage schedule.

Fluorspar in the Open-Hearth

New light is thrown on the chemistry of basic open-hearth practice by an article from a German source in *THE IRON AGE* of March 23 on "Fluorspar in Open-Hearth Practice." It is important to American steel makers in view of the large tonnage of basic open-hearth steel made in this country. Fluorspar is used in almost every heat of such steel, but the common thinking as to its function has not gone beyond the thinning of the slag and the cutting of the lime.

The German studies show that fluorspar does more than this. It is an effective agent, when properly used, in removing sulphur from the steel. Comparing nine heats without fluorspar and nine in which it was used, the writer shows that in the first set, with all other conditions the same, the average sulphur content of the finished steel was 0.08 per cent and in the second set sulphur was down to 0.05 per cent. The author controverts the theory that desulphurization, when fluorspar is used, is brought about by the slag being thus rendered more basic, and he shows by actual results that the ratio of the oxygen of the bases to that of the acids was 1.67 without fluorspar and 1.30 when fluorspar was used, there being in the latter case a marked decrease in sulphur in the steel. The presence of too much sulphur in basic steels has been a matter of no small concern in this country, it being more difficult to remove this element than to remove phosphorus in basic practice.

The basic open-hearth process, once the young competitor of the Bessemer, has been gathering years, but apparently we have not learned all its possibilities. The chemical reactions involved are many and it is to be expected that other disclosures quite as valuable as those regarding fluorspar will be made from time to time, to the improvement of the process and the product. Recent information regarding the use of lime will bring changes in that feature of the process. There is also the matter of substitutes for fluorspar or the use of other additions to supplement it. All of this and like effort means a steady advance toward the goal of quantity production of high quality steel.

The most important deduction from the February statistics of British foreign trade in iron and steel, analyzed elsewhere, is that the pre-war balance between exports and imports is being restored. Imports, which have been relatively large in the last two years, have been declining until in February they reached the lowest figure since April, 1920. Pig iron imports, which were unprecedentedly heavy last year, were less in February than one-third the monthly average receipts in

1921. These facts demonstrate that the British industry is approaching a self-sustaining condition and becoming independent of continental competition. It is to be noted that total steel exports in February were much larger than those from the United States—228,370 tons, as compared with 133,975 tons, and over 30 per cent of the latter amount went to Japan. Not only in volume but also in countries sold to British exporters are maintaining a marked supremacy.

Buying Power and Steel Demand

The fallacy of predicting the volume of business on the appraised "needs" of the public has been proved repeatedly by divergences sometimes in one direction sometimes in the other. In the years 1905-6-7 there was a volume of business, particularly in investment construction, far above what would have been forecast except by the abnormally sanguine. In the other direction has been the failure of Mexico and Russia to buy in accordance with their apparent needs.

Buying power is a much better measure with which to gage the prospects of business activity, but this is only as to the sum total. In other words, people as a rule can be counted on to spend their money, but what they will be disposed to buy with their money is another matter.

To study this difference it may be illuminating to set together the estimates of national income made by the Bureau of Economic Research and the production of steel ingots. As the citation is of tonnage and not of market value, the Bureau's presentation not of actual income but of income reduced to "the 1913 dollar" is taken. In the first column of the table below is given the adjusted income, in billions of dollars, in the second the relative figure for the year named, 1913 being taken as 100, and in the third column is given the tonnage of ingot production.

	Adjusted Income	Relative to 1913	Ingot Production, Gross Tons
1909.....	30.1	88	23,298,779
1910.....	32.2	94	25,154,087
1911.....	31.7	92	23,029,479
1912.....	33.2	97	30,284,682
1913.....	34.4	100	30,280,130
1914.....	33.0	96	22,819,784
1915.....	25.2	102	31,284,212
1916.....	40.7	118	41,401,917
1917.....	40.8	119	43,619,200
1918.....	38.8	113	43,051,022

There was a plain and consistent tendency in the steel ingot production to fluctuate in the same directions as the national income, but the fluctuations in steel were by far the more violent. The particular rise of steel in the war years was due, of course, to steel being a very important war material, and much of it was bought by capital expenditures of the United States and other nations engaged in the war. The war years are included in the above table chiefly because the presentation of the Bureau of Economic Research has an interest of its own, the figures extending through 1918. It is not assumed that the showing of steel in the war years is particularly illuminating.

As to the pre-war years, however, one observes that 1911 showed somewhat more income than 1909, but somewhat less steel, while for 1912 and 1913 steel took a great jump while income increased only

a trifle. Thus the matter of how income was spent is seen to be important.

Steel is not bought by current income entirely, however. Particularly in years of heavy demand the steel is bought largely by capital expenditures, essentially the investment of accumulated savings. There are, however, great variations in the manner in which capital is invested. There may be at one time much investment in dwelling-house construction, involving little steel per dollar invested, and at another time much investment in factories and sky-scrappers, requiring much steel in proportion to the investment. At one time vehicle roads may be built and at another time railroads.

There is, therefore, no thorough and completely governing connection between buying power and demand for steel. Much less, it should be added, is there a perfect control of demand for steel by price for steel. Repeatedly it was argued in the early part of last year that the steel mills should, in essence, make a price that would move the goods. That is something that cannot be done. The people will spend their money as they wish. They do not weigh the relative cost of cinema performances and automobiling to determine how they will lay out their income, or the relative cost of dwelling houses and stock in hotel enterprises to determine how they will invest their capital.

CORRESPONDENCE

Questions Oil Supply Predictions

To the Editor: Twenty years from now the gasoline motor car will be gasolineless, the motor-boat a memory and the airplane a museum curio. Industry dependent upon the derivatives of petroleum will have to look to other sources for fuel and lubrication.

All this is true—if the predication just made by the United States Geological Survey is accurate. Fifteen geologists have been figuring on the nation's reserve supply of oil and, from the Survey's office, have issued the result of their investigations—that the supply of crude oil in the United States will last twenty years. There are only 9,000,000,000 bbls. left in the ground.

Imagine the havoc which exhaustion of oil would bring to this country. The automotive industry, with its billions of invested capital, would be a total failure. How many cars would fill junk piles is speculative. There were 10,449,785 registered cars and trucks in this country in 1921, representing a normal increase over the past year of 14.2 per cent. These would be worthless. And the failure of the automotive industry would have a decidedly bad effect upon the country as a whole. Instead of progressing the country would go backward.

But how does the oil industry as a whole receive this report; how much of credence do they place in the statements? Not a great deal, for they call attention to similar reports in past years and how they have come to naught. But let us look into the past and then reckon for the future.

Back in 1889 the Government's official bulletin, "Mineral Resources of the United States," carried oil reserve predictions. It stated that the principal oil producing regions of the country were "Western Pennsylvania, New York, the Turkey Foot and other districts of West Virginia, the Macksburg and Lima fields of Ohio, the Florence district of Colorado, and the oil fields of southern California." And, continuing, the article related "Not only are the localities above the chief petroleum producing districts in the United States, but the indications are that, with the possible

exception of Wyoming, they will continue to be so. . . . The Illinois field is an exceedingly small one, but with little promise for the future, while the Kansas and Texas fields will at the best probably produce only a few thousand barrels each year."

Oklahoma, reckoned in all sections of the country as the greatest of oil States, is not mentioned in this prediction. Since that prediction Oklahoma has produced a billion and an eighth barrels, Kansas has produced two hundred million barrels and Texas seven hundred million barrels. Illinois, reckoned small, has produced approximately four hundred million barrels and California almost a billion and a half. And these States, not considered important at the time of the report, have since produced over 75 per cent of the entire country's production.

In 1909, in official bulletin 394, U. S. Geological Survey, it was admitted that Texas and Louisiana were factors in petroleum production. "It is estimated that the Texas fields will surely produce 200,000,000 bbls. and Louisiana 50,000,000 bbls.," the report states.

Now to-day Texas has probably produced four times that much and is far from inactive, while Louisiana has produced 175,000,000 bbls.

And so it goes. Predictions were made in the past and shown to-day to be at fault. How, then, can an absolute estimate be made of the supply underground when new fields are being discovered with rapidity? The oil industry, as a whole, discredits the recent report of the survey.

There are countless regions in this country to-day where prospecting for oil has not been considered. The wildcatter has still to exhaust the regions around which are producing territory before he sets his derrick in other states. It is quite as probable that as much oil will be produced from States not even considered to-day as was produced from Oklahoma, which was not even considered in the report of 1889.

Notwithstanding these predictions we will still ride in motor cars, we will still enjoy a motor-boat trip on the lake, airplanes will not pass out of existence, and industry can rely on petroleum products to keep running, says the oil industry.

R. W. SPAKE.

Galesburg, Ill.

Additions to West Leechburg Plant

Capacity of the West Leechburg Steel Co., Pittsburgh, maker of hot and cold rolled strips and hoops and bands, will be materially increased by the addition of a new continuous hot strip mill, with 20-in. roughing stands and 16-in. finishing stands. This mill and the cooling beds, to be furnished by the Treadwell Engineering Co., Easton, Pa., will be electrically driven, the Westinghouse Electric & Mfg. Co. to furnish the motors and the other electrical equipment. The company also will install two large continuous heating furnaces, contract for which will probably be let this week. A new pickling house is to be erected, and the enlarged productive capacity calls for more warehouse room, which means the extension of existing storage space and a new building for that purpose.

Month Without Accident

During the month of February, there was not a single accident at South Works, Illinois Steel Co., which caused loss of time to any employee. This is the first month in the history of the plant as far back as the records go, when such has been the case and it is regarded as a splendid exhibition of co-operation on the part of every employee in bringing about so unusual an achievement. While the record stands out by way of comparison with those of other months, it actually covers a period of nine days more than a month, i. e. from Jan. 28, to March 5.

M. A. Hanna & Co., Cleveland, have issued their iron ore book for 1922, containing cargo analyses for 1921. Various statistical tables of interest to the trade are included, as well as a new table not contained in previous issues, showing freight rates from Lake Erie ports to interior furnaces from 1914 to 1922 inclusive.

Coal Strike Conditions Not Alarming

Many Iron and Steel Industries Supplied from Non-Union
Mines Not Affected—All Union Men Idle—
Large Supplies on Hand

PITTSBURGH, April 4.—About 75 per cent of the coke used in Pittsburgh and nearby districts is made from non-union coal, the Jones & Laughlin Steel Co. being the only important steel company in this and nearby districts the coal properties of which are operated under union conditions, and that company beside drawing freely from its own mines has been a liberal purchaser of non-union coal, and is estimated to-day to have a stock sufficient for at least 60 days on to-day's rate of operation of its steel works, which is between 65 and 70 per cent, taking in both its Pittsburgh and Woodlawn plants. The Republic Iron & Steel Co. has coal operations in the Connellsville district which are non-union, and also one at Russellton on the Bessemer & Lake Erie Railroad, which is union, but no coking coal is secured from the latter property. Brier Hill Steel Co. has mines in the Connellsville district and so also has the Youngstown Sheet & Tube Co. The latter is believed to be fortified for at least 30 days. All of the Pittsburgh and nearby plants of the Steel Corporation are supplied with coke made from non-union coal and most of these plants have at least a month's supply in reserve.

The strike as far as union mines is concerned, is all that the union leaders claimed it would be, all mines being idle. The non-union district has not entirely escaped. About a dozen good-sized mines including four of the H. C. Frick Coke Co. were not working to-day because of the failure of a sufficient number of inside men to report for duty. These suspensions may prove only temporary, although it is a fact that union organizers have been pretty active in the Connellsville district, and by threats of violence usually made through the wives of workmen, a good many men who want to work are kept away through fear. Miners in the Connellsville district generally are well satisfied with the scale now prevailing, and are not eager to quit. It is possible that the celebration of Mitchell day, which was on a pretty extensive scale at Brownsville and some of the other big centers, Saturday, may have been partly responsible for the failure of inside men to report in full numbers this morning. It is too early to tell definitely the extent of the effect of union propaganda in the Connellsville districts.

Coke Output Gained Last Week

UNIONTOWN, PA., April 3.—Coke production in the Connellsville region again has shown a substantial gain during the week just closed. The principal increase has been with the H. C. Frick Coke Co., which has fired some 2000 additional ovens during the past ten days, bringing the coke production of the company up to nearly 50 per cent, this representing approximately 6000 active ovens in the region. Independent coke production throughout the region also has increased, although the exact list of additional ovens fired during the week is not available.

Coal production in the region made a slight gain last week. Prices have not increased. Following a flurry a month or so ago, the coal market slid off slightly and has been more or less soft since although production has gained somewhat.

As the coal strike in the union fields is inaugurated, the Connellsville region to-day is practically unaffected. Union mines along the Monongahela River in the county are idle and one or two plants directly adjoining were idle to-day, although it could not be determined whether the men would remain out or not. Pamphlets asking the non-union men to join in the strike have been distributed throughout the region and

reports have been received that a number of union representatives have been at work. However, it is not thought that their efforts will have any important result.

Sheriff Shaw has issued a proclamation in accordance with the riot act prohibiting public gatherings and guaranteeing protection to property and individuals. The proclamation is largely in the nature of a formality and is not issued in anticipation of any serious difficulties. A number of special officers have been sworn in, extra State police are here and every precaution has been taken to meet quickly any emergency that should develop. Special guards have been put on railroad bridges and tunnels in the county.

Supplied Largely by Non-Union Mines

CHICAGO, April 4.—Practically all of the Pocahontas coal used in making coke for Chicago district furnaces comes from non-union mines which are still operating so far as can be learned. The high volatile coal in the mix comes largely from union Illinois and Indiana mines which are idle on account of the strike. Stocks of coal accumulated by Chicago district furnaces prior to the strike will take care of their needs about 60 days ahead. This is the case with the Illinois Steel Co., the Inland Steel Co. and the Steel & Tube Co. of America. The Wisconsin Steel Co., which gets most of its coal from its own mines in Kentucky, has more than a month's supply and expects no interruption in shipments, as its operations are non-union.

The Illinois Steel Co. gets not only its Pocahontas coal from non-union mines but also Elkhorn, a high grade of steam coal. If the strike is of sufficient duration, some local producers may find it necessary to use coking coal for steam purposes. It is not believed, however, that the railroads will commandeer Pocahontas coal as they prefer other grades.

Increased Mining of Coal

WASHINGTON, April 4.—A final spurt of activity in anticipation of the strike carried production of soft coal up to 11,437,000 tons in the week ended March 25, according to the Geological Survey. The output was the largest recorded since December, 1920, and exceeded by nearly 400,000 tons the lesser peak reached last October when consumers anticipated a possible railroad strike. Production was still far short of what the mines can produce and the railroads transport, for in the last week before the great coal strike of 1919, a total of 13,140,000 tons was recorded.

As the present rate of consumption and shipment abroad is not more than 8,300,000 tons a week, the output in the week of March 25 provided at least 3,000,000 tons to be added to consumers' stock piles. This confirms the forecast that stocks in the hands of consumers would reach 63,000,000 tons by April 1.

Like bituminous coal, the production of anthracite increased sharply during the week of March 25. The railroads serving the anthracite region loaded 40,065 cars as against 36,459 in the week preceding. The total production including mine fuel and local sales is estimated at over 2,000,000 net tons, close to the maximum for the region.

There is a surplus stock of 1,000,000 tons of coke on hand at by-product coke works, much of which may be considered as a substitute for anthracite.

The daily rate of production of by-product coke continued to increase slowly in February although be-

cause the month contained only 28 days the total output was less than in either of the two months preceding. The month's production was 1,795,000 net tons, or 64,100 per day. In comparison with the daily average in January, this was an increase of 4.5 per cent. The plants operated on the average of 54.2 per cent of capacity. Of the 71 plants in existence, only 59 were in operation during the month and 12 were idle.

These statistics are based upon reports from 70 of the 71 plants and include an estimate for the one not reporting.

Beehive ovens produced 549,000 tons in February and the total output of all coke for the month was 2,344,000 tons, only 54 per cent of the 1920 average.

Not Alarmed at Youngstown

YOUNGSTOWN, OHIO, April 4.—Fully 75 to 80 per cent of the coke used in district furnaces is made from non-union coal. All by-product coke plants are operating normally and have large coke reserves. These accumulations are sufficient for at least two months steady operations.

Coke ovens can use all Connellsville and Pocahontas coal, which is largely non-union, if necessary. One independent uses 24 per cent of union coal in its ovens; another states that it uses largely non-union, while a third reports that the percentage varies, with non-union proportion ordinarily high. Operation of non-union mines will have an important bearing on the supply, say steel interests.

The mines at Nemacolin, Pa., of the Youngstown Sheet & Tube Co., producing from 1200 to 1500 tons of coal daily, are as yet unaffected by the strike. This property is operated on the open shop plan.

"Mill operations will not be affected by the strike if it is confined to the union fields," states James A. Campbell, president Youngstown Sheet & Tube Co.

Large Stocks of Cleveland Companies

CLEVELAND, April 4.—Blast furnace interests in this district that operate coke ovens have good stocks of coal, generally sufficient to last about two months and no immediate anxiety is felt over the fuel situation. The McKinney Steel Co. secures coal from its own mines in Kentucky, these being in a non-affected district, and has about a six weeks' supply at its coke plant. The Hanna Furnace Co. uses non-union coal at its Cherry Valley furnace, where it now has a two months' supply. Its Dover by-product is not operating, coke for Dover furnace coming from the Connellsville district. The Detroit Furnace is assured at least a two months' supply of coke from the local Semet-Solvay plant. The Toledo Furnace Co. has a 60-day supply of coal for its coke oven plant. Most of its coal comes from Pennsylvania non-union mines. The Bourne-Fuller Co. is depending on coke shipments from the Connellsville district for operating its blast furnace. The United Alloy Corporation, Canton, has a 60-day supply of coal on hand. The Otis Steel Co. has decided to blow in one of its blast furnaces about April 15, providing it can secure a supply of coal for its by-product plant.

More Ovens Fired

UNIONTOWN, PA., April 4.—At noon of the second actual "strike day" of the union coal miners, the Connellsville unorganized bituminous region is not materially affected. There have been defections at some plants in proximity to union mines along the river. Estimates, however, are that not more than 1200 men are idle, and it is doubtful whether they will remain away from their jobs longer than a day or two. Hopes of the union for a sympathetic strike in the unorganized region here have failed.

Production is increasing in both coal and coke. The Frick Coke Co. added 600 ovens to the active list yesterday, bringing coke production up to 65 per cent for the Frick company. The Oliver-Snyder Co. has fired 200 ovens at Oliver No. 3 and is shipping 30 per cent coal at Oliver No. 1.

Fifty Years of Machine Tool Growth

"Hendey: 1870-1920." Under this title a volume of 112 pages has been published by the Hendey Machine Co., Torrington, Conn., to mark the 50th anniversary of the founding of its business. The book is called "a brief record of a charted course," and something of the spirit of an organization that, while it can boast of years, is eminently forward-looking, is shown in this sentence from the foreword: "For those of us who are associated and privileged to carry on in the Hendey Machine Co. there is and will be an individual obligation—inspiring, tried and worth-while—building upon the ideals of the founder, Henry J. Hendey." The founder was born in 1844 in London, England, and early in life came to Connecticut. In 1865 he removed from Waterbury to Torrington, where he lived continuously until his death in 1906. He had learned the trade of machinist at Waterbury. The 3-hp. rotary engine which furnished the motive power for the original small plant which Henry J. Hendey and Arthur, his brother, built at Torrington, then Wolcottville, was designed and built entirely by the former. He did the work at night after leaving his daily 12-hr. task. This engine now stands on a table in the engine room of the present plant.

The small one-story shop of 1871 was not full of orders and Henry Hendey continued to work part of his time for others. By the fall of 1872 the growth had been such as to justify extension and a two-story wooden shop, 40 x 60 ft., was built. In 1873, when the new plant started up, 15 to 20 men were on the payroll. Arthur Hendey moved West for his health in 1875 and the direction of the enterprise from that time on was in the hands of Henry J. Hendey. The plant had trebled by 1880, the Hendey Machine Co. being organized meanwhile. Friction-drive planers and shapers were the chief product in the late '70s, and a few hand lathes had been made. In 1887 there was a definite drift towards the lathe, when semi-automatic turning and heavy spinning lathes were added to the line. In 1890 the engine lathe headed the standard line. The year 1892 was epochal for the introduction in Hendey lathes of the first commercially successful quick-change gear box equipment. Milling machines appeared in the catalog of 1894.

The expansion of the business to its proportions of to-day and the successive additions of plant are described in the volume, and are largely ascribed to the founder's combination of the practical and the ideal, and to his selection of men who had a like regard for high standards. The evolution of all the company's products is described in its relation to the development of industries into which the Hendey machines have gone.

The author has succeeded well in having his narrative carry the spirit that has marked all the effort of a half century and thus the volume commemorates the best in the marvelous machine tool expansion of the years since 1890. In the trying war period, when the pressure for deliveries put all standards to the severest test, the company continued its research and development work, and we are told that "numerous improvements appearing at present and which will shortly materialize date back to the war-time period." Charles H. Alvord, who was vice-president and treasurer in that period, became president in 1919.

In its illustrations and text and in all the externals of book-making, the Hendey volume is attractive to an unusual degree. Highly valuable historically are the reproductions of early and present day types of machines.

The quarterly survey conducted by the Springfield, Ohio, Chamber of Commerce, showed that many factories in that city were operating forces of from 65 to 70 per cent of normal on a five and one-half day basis. Eighty-two per cent of the factories were operating on a basis of three and one-half days a week or more. Six factories were operating above normal. The survey included in its scope 225 industrial establishments.

MARCH PIG IRON OUTPUT

A Gain of 7,425 Tons Per Day Over February

Twenty-one Furnaces Blown In, Four Out

A marked increase in the country's production of pig iron took place in March. The gain per day of 7425 tons over February was the largest of any of the increases registered for any month since the steady increase which has prevailed since last August. The next largest gain in recent months was 7155 tons per day in the October production over that of September. The March increase compares with 5151 tons per day for February over January.

The production of coke and anthracite pig iron for the 31 days in March amounted to 2,034,794 gross tons or 65,639 tons per day as compared with 1,629,991 tons, or 58,214 tons per day for the 28 days in February. March is the first month since January, 1921, in which the total has exceeded 2,000,000 tons. The increase in March over February was 404,803 tons. In March, a year ago, the total output was 1,595,522 tons.

The total number of furnaces in blast on April 1 was 155, as compared with 138 on March 1 and with only 69 on Aug. 1, 1921, the low point in the depression. The capacity of the 155 furnaces in blast April 1 is estimated at 69,015 tons per day as against a capacity of 59,080 tons per day for the 138 furnaces in blast March 1. A majority of the furnaces blown in during March came in late in the month, several on March 31. In March, 21 furnaces were blown in and four blown out or banked, the net gain being 17. In February the net gain was 12 furnaces.

Of the manganese-iron alloy output of 13,695 tons in March, the largest total since last April, 11,600 tons, was ferromanganese.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from March, 1921, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works	Merchant	Total
March, 1921	42,691	8,777	51,468
April	33,854	5,914	39,768
May	33,054	6,340	39,394
June	29,444	6,050	35,494
July	23,086	4,803	27,889
August	26,037	4,743	30,780
September	27,189	5,661	32,850
October	33,365	6,850	40,215
November	37,960	9,223	47,183
December	41,173	12,023	53,196
January, 1922	42,130	10,933	53,063
February	46,827	11,387	58,214
March	53,511	12,128	65,639

The figures for daily average production, beginning with January, 1916, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1916—Gross Tons

	1916	1917	1918	1919	1920	1921	1922
Jan.	102,746	101,643	77,799	106,525	97,264	77,945	53,063
Feb.	106,456	94,473	82,835	105,006	102,720	69,187	58,214
Mar.	107,667	104,882	103,648	99,685	108,900	51,468	65,639
Apr.	107,592	111,165	109,607	82,607	91,327	39,768	.....
May	108,422	110,238	111,175	68,002	96,312	39,394	.....
June	107,053	109,002	110,793	70,495	101,451	35,494	.....
July	104,017	107,820	110,354	78,340	98,931	27,889	.....
Aug.	103,346	104,772	109,341	88,496	101,529	30,780	.....
Sept.	106,745	104,465	113,942	82,932	104,310	32,850	.....
Oct.	113,189	106,550	112,482	60,115	106,212	40,215	.....
Nov.	110,394	106,859	111,802	79,745	97,830	47,183	.....
Dec.	102,537	92,997	110,762	84,944	87,222	53,196	.....

Furnaces Blown in and Out

Among the furnaces blown in during March were the following:

No. 4 furnace of the Lackawanna Steel Co. in the Buffalo district; one furnace of the New Jersey Zinc Co. in the Lehigh Valley; Nos. 1 and 5 Carrie furnaces, No. 1 Duquesne furnace, Nos. 1 and 3 Isabella furnaces of the Carnegie Steel Co. and No. 2 Monongahela furnace of the National Tube Co. in the Pittsburgh district; No. 2 Farrell furnace of the Carnegie Steel Co. in the Shenango Valley; two Johnstown furnaces of the Cambria Steel Co. in western Pennsylvania; Nos. 2 and 4 Haselton furnaces of the Republic Iron & Steel Co. and D furnace of the Youngstown

Sheet & Tube Co. in the Mahoning Valley; Belfont furnace in the Hanging Rock district in southern Ohio; Nos. 1 and 3 South Chicago (new) furnaces of the Illinois Steel Co. and No. 8 Gary furnace in the Chicago district; No. 2 Ensley furnace and the Alice furnace of the Tennessee Coal, Iron & Railroad Co. and No. 3 Woodward furnace of the Woodward Iron Co. in Alabama.

Among the furnaces blown out or banked during March were the following:

One furnace of the Bethlehem Steel Co. and the Robeson furnace in the Lebanon Valley; Mattie furnace in the Mahoning Valley and the Sarah furnace in southern Ohio.

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for March and the three months preceding:

Pig Iron Production by Districts, Gross Tons

	March (31 days)	February (28 days)	January (31 days)	December (31 days)
New York	124,584	105,708	110,867	126,734
New Jersey	4,199	3,947	4,642	5,026
Lehigh Valley	32,142	29,094	31,296	31,388
Schuylkill Valley ..	56,893	44,674	42,144	41,450
Lower Susquehanna and Lebanon Val- leys	19,948	26,074	28,227	26,106
Pittsburgh district..	479,433	388,698	382,407	290,908
Shenango Valley....	59,901	52,402	54,234	52,793
Western Penna....	98,502	61,459	45,511	56,593
Maryland, Virginia and Kentucky....	24,172	22,222	22,858	18,917
Wheeling district...	80,819	69,865	75,576	72,660
Mahoning Valley...	207,892	172,136	190,436	188,391
Central and North- ern Ohio	226,765	187,918	161,160	167,307
Southern Ohio.....	35,333	30,568	31,892	15,534
Illinois and Indiana	361,003	273,444	287,313	299,180
Mich., Minn., Mo., Wis. and Colo....	64,665	51,233	48,236	37,149
Alabama	157,441	109,667	121,073	117,886
Tennessee	1,102	882	825	1,064
Total	2,034,794	1,629,991	1,638,697	1,649,086

Capacities in Blast April 1

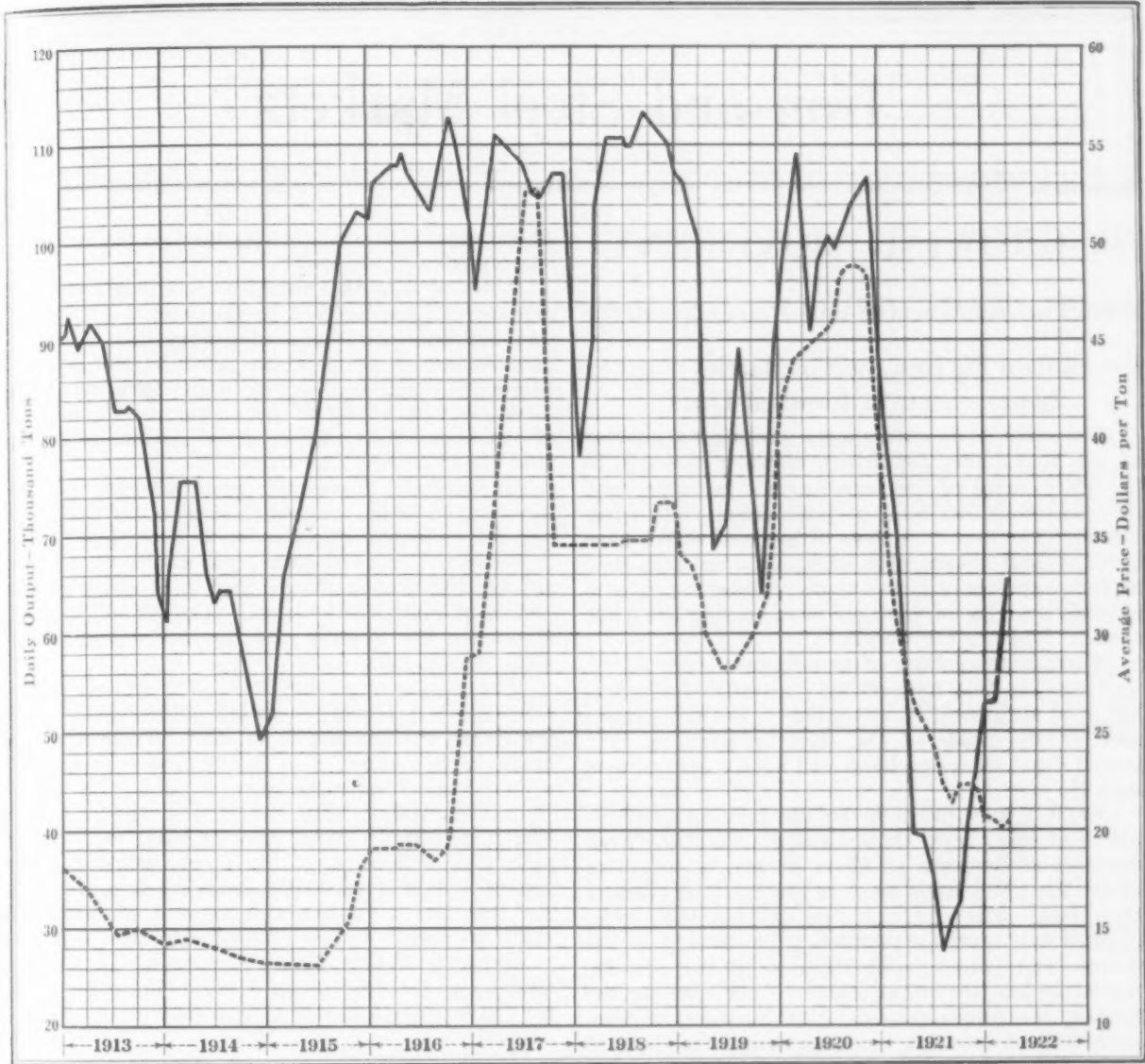
The following table shows the number of furnaces in blast April 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast March 1:

Coke and Anthracite Furnaces in Blast

Location of Furnaces	Total Stacks	April 1		March 1	
		In Blast	Capacity per Day	In Blast	Capacity per Day
New York:					
Buffalo	22	10	4,250	9	3,750
Other New York....	4	0	.....	0	.....
New Jersey	4	1	135	1	140
Pennsylvania:					
Lehigh Valley	18	3	970	3	1,000
Spiegel	2	1	95	0	.....
Schuylkill Valley ..	15	5	1,835	5	1,725
Lower Susquehanna.	10	1	500	1	440
Lebanon Valley	6	0	.....	2	410
Ferro and Spiegel..	2	1	80	1	80
Pittsburgh District..	55	35	17,370	30	14,000
Ferro and Spiegel..	4	3	345	2	225
Shenango Valley ...	19	5	2,330	4	1,830
West, Pennsylvania..	26	9	3,500	7	2,440
Maryland	6	1	465	1	475
Wheeling District	15	5	2,600	5	2,490
Ohio:					
Mahoning Valley....	28	14	6,635	12	6,000
Central and Northern	26	14	7,315	14	6,100
Southern	16	3	1,145	3	1,090
Illinois and Indiana..	42	22	11,690	19	16,200
Mich., Wis. and Minn..	11	3	1,325	3	1,200
Colorado and Missouri.	6	2	760	2	720
The South:					
Virginia	16	0	.....	0	.....
Kentucky	7	1	315	1	320
Alabama	41	15	5,320	12	4,415
Tenn., Ga. and Texas..	16	1	35	1	30
Total	417	155	69,015	138	59,080

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the following totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."



The Full Line Represents the Daily Production of Pig Iron and the Dotted Line Is the Average of the Price Per Ton of No. 2 Southern Pig Iron at Cincinnati, Local No. 2 Iron at Chicago and No. 2X Iron at Philadelphia

Production of Steel Companies—Gross Tons						
	Total Production			Spiegeleisen and Ferromanganese		
	1920	1921	1922	1920	1921	1922
Jan.	2,232,455	1,932,159	1,306,045	23,957	22,228	6,874
Feb.	2,181,679	1,625,695	1,311,170	28,038	29,013	8,540
Mar.	2,480,668	1,323,443	1,658,556	35,275	41,294	13,695
Apr.	1,968,542	1,015,621	.....	27,628	24,310	.....
May	2,128,720	1,024,678	.....	33,407	9,232	.....
June	2,209,770	883,312	.....	34,751	4,536	.....
July	2,230,567	715,664	.....	36,789	5,524	.....
Aug.	2,254,943	807,144	.....	36,985	3,878	.....
Sept.	2,247,250	815,692	.....	39,546	3,289	.....
Oct.	2,393,644	1,034,312	.....	34,786	3,902	.....
Nov.	2,150,075	1,138,789	.....	26,944	3,525	.....
Dec.	2,047,167	1,276,381	.....	28,023	3,953	.....

Diagram of Pig Iron Production and Prices

The fluctuations in pig iron production from 1913 to the present time are shown in the accompanying

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1918—Gross Tons					
	1918	1919	1920	1921	1922
Jan.	2,411,768	3,302,260	3,015,181	2,416,292	1,644,951
Feb.	2,319,299	2,940,168	2,978,879	1,937,257	1,629,991
Mar.	3,213,091	3,090,243	3,375,907	1,595,522	2,034,794
1st Quar.	7,944,158	9,332,671	9,369,967	5,949,071	5,309,736
Apr.	3,288,211	2,478,218	2,739,797	1,193,041	.....
May	3,446,412	2,108,056	2,985,682	1,221,221	.....
June	3,323,791	2,114,863	3,043,540	1,064,833	.....
July	3,420,988	2,428,541	3,067,043	864,555	.....
Aug.	3,389,585	2,743,388	3,147,402	954,193	.....
Sept.	3,418,270	2,487,965	3,129,323	985,529	.....
Oct.	3,486,941	1,963,558	3,292,597	1,246,676	.....
Nov.	3,354,074	2,392,350	2,934,908	1,415,481	.....
Dec.	3,433,617	2,633,268	2,703,855	1,649,086	.....
TOTAL	38,506,047	30,582,878	36,414,114	16,543,686	.....

*These totals do not include charcoal pig iron. The 1921 production of this iron was 94,730 tons.

chart. The figures represented by the heavy line are those of daily average production by months of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnaces in Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

Blast Furnace Notes

The two Bird Coleman furnaces of the Bethlehem Steel Co., in the Lebanon Valley, have been completely dismantled. This reduces the total number of blast furnaces in the country, regarded as actually capable of relighting, from 419 to 417.

Of the 21 furnaces blown in during March, 12 were Steel Corporation furnaces, six belong to independent steel producers and three are merchant furnaces. Of the four furnaces blown out or banked in March, three were merchant and one was an independent steel-making furnace.

At the monthly meeting of the Cleveland chapter of the American Society for Steel Treating, March 31, D. W. McDowell, chief inspector, Jones & Laughlin Steel Co., Pittsburgh, spoke on the "Testing of Steel Plates." Chester M. Moody, metallurgist, Minneapolis Steel & Machine Co., Minneapolis, Minn., discussed "Tractor Gear Problems" and H. C. Goodwill, superintendent of dies, R. Wallace & Sons Mfg. Co., Wallingford, Conn., spoke on "Hardening of Dies."

Iron and Steel Markets

A GROWING MOVEMENT

Steel Output Greater and Prices Stronger

Pronounced Pig Iron Gain in March—Further Improvement in Finished Lines

The steel trade enters upon the second quarter of the year under conditions pointing strongly to the continuance of the improvement in output and in prices that has been so pronounced since early March. The first four days of the coal strike have been without measurable effect on iron and steel markets, and there is the same complacency over a possible scarcity of fuel, pig iron or steel that has been in evidence for weeks.

A small percentage of non-union miners in the Connellsville field have failed to report for work, but it is still expected non-union mines will supply most of the needs of the steel industry, so that the 60 days' stocks on hand will not be drawn upon heavily.

April 1 may prove to be the turning point in prices of steel bars, shapes and plates, since large amounts of business at \$2 to \$3 per ton or more below the 1.50c. basis went to the mills just before that date. The situation now is that both independent and Steel Corporation mills can run at the present rate, which is slightly over 70 per cent for the latter and somewhat under 70 per cent for the former, for several weeks. New business in bars, some of it of fair size, has been put on the books at 1.50c. and there is more firmness in shapes. Demand for plates still lags farther behind supply than in the other two products, and there are the special concessions car work has commanded.

Pig iron output made a great gain last month, March being the first month since January, 1921, to pass the 2,000,000-ton mark. At 2,034,794 tons, the daily average was 65,639 tons, or 7425 tons a day more than in February. Steel works furnaces gained 6684 tons a day, or 90 per cent of the total.

There was a net gain of 17 in active furnaces last month, the capacity in blast on April 1 being 69,015 tons per day for 155 furnaces, against 59,080 tons per day for 138 furnaces on March 1. Production is now at the rate of 25,200,000 tons per year, or more than 50 per cent greater than the 1921 output. In 1914 the country made 23,332,000 tons.

The March increase in steel output was greater than that in pig iron and the rate of ingot production is now close to 31,000,000 tons per year.

While railroad and structural buying have been important, orders are now taking a wider range. The wire industry, with bookings in March up to 75 or 80 per cent of capacity, is an example. Jobbers have increased their stocks. Sheet buying has been on a liberal scale, the \$3 per ton advances serving to bring in business at the old prices. Some leading sellers had the largest month in March since June, 1920.

Stronger prices crystallized into orders in the last days of March some 27,000 tons of fabricated steel work. New projects appeared for upward of

38,000 tons. Unusual activity marked the contracting for reinforcing bars.

The two leading locomotive companies took orders for 42 locomotives in the past week. More than 300 locomotives are being figured on. Freight cars ordered so far this year, over 34,000, are one-half more than were bought in all 1921. The New York Central, which at first bought 125,000 tons of rails and then increased to 150,000 tons, has now placed 30,000 tons more.

The city of Cleveland opens alternative bids April 12 on 60-in. riveted steel pipe and cast iron pipe for nine miles of water works extensions. While 22,500 tons of cast iron pipe would be needed, against 13,000 tons of steel pipe, it is now expected cast iron pipe will be used. The 12,000 tons of plates for the Seattle pipe line have been placed with two Eastern mills.

The pig iron market has been active, with a more marked tendency toward higher prices. In the South the advance is at least 50c. to a \$15.50 basis, with a number of large producers quoting \$16. In the North the upward trend of prices is shown at Buffalo, Pittsburgh and other centers. The sales include 10,000 tons of basic at Philadelphia and 5000 tons at St. Louis, while foundry grades include from 40,000 to 50,000 tons of Southern iron and a considerable amount of Northern, made up mostly of lots of moderate sizes.

Exporters fear a check on business with the Far East now that an ocean freight increase of \$2 per ton is going into effect, with steel prices tending upward.

Leading manufacturers of steel castings have announced new discounts which represent average reductions of \$2 per ton.

German steel prices have advanced further, but operations both in Germany and Belgium are only 40 per cent of capacity. Germany is seeking raw materials far afield, having taken several hundred thousand tons of Newfoundland iron ore at \$4.25 c.i.f. Germany has inquired for 10,000 tons a month of American steel scrap, offering \$16 c.i.f. Hamburg, but was quoted \$20.

Pittsburgh

PITTSBURGH, April 4.

Observance of cost sheets as a factor in selling prices still is increasing among steel manufacturers and this, coupled with the fact that the activity of the past three weeks has provided them with a comfortable backlog of orders, is reflected in further upward revisions of prices. There is now no disposition to go below the 1.50c. base on bars and shapes and 1.50c. is the common asking price on plates, although there is still some doubt that this figure would be insisted upon in case a really desirable tonnage is offered. Protections given buyers on tonnages of plates, shapes and bars at prices prevailing prior to the advance of a few weeks ago are believed to have largely expired as of last Saturday.

A firmer market in tubular goods and a better business in it is beginning to find reflection in the price of steel skelp. Makers of light rails are not disposed to dip as low for orders now as they would have a few weeks ago and 1.90c., Pittsburgh, is well established as a minimum price against new business

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Apr. 4, 1922	Mar. 28, 1922	Mar. 7, 1922	Apr. 5, 1921
No. 2X, Philadelphia...	\$21.34	\$21.26	\$21.26	\$26.26
No. 2, Valley furnace...	19.00	19.00	19.00	25.00
No. 2, Southern, Cin'tif...	20.00	19.50	19.50	29.50
No. 2, Birmingham, Ala...	15.50	15.00	15.00	25.00
No. 2 foundry, Chicago...	20.00	20.00	20.00	24.00
Basic, del'd, eastern Pa...	20.00	20.25	19.84	25.00
Basic, Valley furnace...	18.00	18.00	17.75	23.00
Valley Bessemer, del. P'gh	21.46	21.46	21.46	26.96
Malleable, Chicago...	20.00	20.00	20.00	24.00
Malleable, Valley...	19.00	19.00	19.00	25.00
Gray forge, Pittsburgh...	20.71	20.71	20.71	25.96
L. S. charcoal, Chicago...	26.00	26.00	26.00	38.50
Ferromanganese, seaboard	62.50	62.50	62.50	90.00

Rails, Billets, etc., Per Gross Ton:	Apr. 4, 1922	Mar. 28, 1922	Mar. 7, 1922	Apr. 5, 1921
O.-h. rails, heavy, at mill	\$40.00	\$40.00	\$40.00	\$47.00
Bess. billets, Pittsburgh...	29.50	28.00	28.00	38.00
O.-h. billets, Pittsburgh...	29.50	28.00	28.00	38.00
O.-h. sheet bars, P'gh...	31.00	29.00	29.00	38.00
Forging billets, base, P'gh	34.50	32.00	32.00	43.00
O.-h. billets, Philadelphia	35.24	35.24	33.74	44.24
Wire rods, Pittsburgh...	38.00	36.00	36.00	52.00
Skeip, gr. steel, P'gh, lb...	1.40	1.40	1.40	2.10
Light rails at mill...	1.45	1.40	1.40	2.35

Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	1.81	1.76	1.71	2.35
Iron bars, Chicago...	1.60	1.60	1.55	2.38
Steel bars, Pittsburgh...	1.50	1.40	1.35	2.00
Steel bars, Chicago...	1.60	1.60	1.50	2.38
Steel bars, New York...	1.88	1.78	1.73	2.38
Tank plates, Pittsburgh...	1.40	1.40	1.35	2.00
Tank plates, Chicago...	1.60	1.60	1.50	2.38
Tank plates, New York...	1.78	1.78	1.73	2.38
Beams, Pittsburgh...	1.50	1.40	1.35	2.00
Beams, Chicago...	1.60	1.60	1.50	2.38
Beams, New York...	1.88	1.78	1.73	2.38
Steel hoops, Pittsburgh...	1.00	1.80	1.80	2.75

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Sheets, Nails and Wire,	Apr. 4, 1922	Mar. 28, 1922	Mar. 7, 1922	Apr. 5, 1921
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.00	3.00	3.00	3.75
Sheets, galv., No. 28, P'gh	4.00	4.00	4.00	4.75
Sheets, blue an'd, 9 & 10	2.25	2.25	2.25	3.00
Wire nails, Pittsburgh...	2.40	2.40	2.40	3.00
Plain wire, Pittsburgh...	2.25	2.25	2.25	3.60
Barbed wire, galv., P'gh...	3.05	3.05	3.05	3.85
Tin plate, 100-lb. box, P'gh	\$4.75	\$4.60	\$4.60	\$7.00

Old Material, Per Gross Ton:

Carwheels, Chicago...	\$17.75	\$17.00	\$15.50	\$14.00
Carwheels, Philadelphia...	15.75	15.75	16.00	18.00
Heavy steel scrap, P'gh...	16.00	15.50	15.00	12.50
Heavy steel scrap, Phila...	13.50	13.50	12.00	11.50
Heavy steel scrap, Ch'go...	13.00	12.75	11.75	11.00
No. 1 cast, Pittsburgh...	16.50	16.50	15.75	18.00
No. 1 cast, Philadelphia...	17.00	17.00	17.00	18.00
No. 1 cast, Ch'go (net ton)	14.25	14.25	13.75	13.00
No. 1 RR. wrot, Phila...	15.50	15.50	15.00	17.00
No. 1 RR. wrot, Ch'go (net)	11.75	11.75	11.25	10.00

Coke, Connellsville, Per Net Ton at Oven:

Furnace coke, prompt...	\$3.40	\$3.25	\$3.25	\$3.75
Foundry coke, prompt...	4.50	4.25	4.25	5.00

Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	12.75	12.87½	13.00	12.75
Electrolytic copper, refinery	12.50	12.62½	12.75	12.50
Zinc, St. Louis...	4.75	4.65	4.62½	4.65
Zinc, New York...	5.10	5.00	4.97½	5.15
Lead, St. Louis...	4.65	4.42½	4.40	4.25
Lead, New York...	4.90	4.70	4.70	4.25
Tin (Straits), New York...	29.50	29.25	29.00	28.50
Antimony (Asiatic), N. Y.	4.50	4.35	4.20	5.12½

Composite Price, April 4, 1922, Finished Steel, 2.048c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets	March 28, 1922, 2.019c March 7, 1922, 1.998c April 5, 1921, 2.729c 10-year pre-war average, 1.639c
These products constitute 88 per cent of the United States output of finished steel	

Composite Price, April 4, 1922, Pig Iron, \$18.47 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham	March 28, 1922, \$18.38 March 7, 1922, 18.25 April 5, 1921, 24.04 10-year pre-war average, 15.72
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in hot-rolled flats in the lighter gages and that price also is being asked by most makers on bands. The tin plate market has stiffened because all makers are well committed while the advance in sheet bars and in tin mill black plate by most of the independent makers also is a factor in putting the market back to a base of \$4.75 per box Pittsburgh. Practically all of the independent sheet makers have followed the advance of \$3 per ton in black and galvanized sheets, announced a week ago by the Wheeling Steel Corporation and some have made a like advance in blue annealed sheets. The American Sheet & Tin Plate Co. has taken no action relative to prices of sheets, evidently waiting to satisfy itself as to how far ahead the independent manufacturers have allowed buyers to cover at the old prices. Some independents have permitted customers to cover their requirements for the entire second quarter and if this has been common practice, the higher quotations will not mean much, except as a stimulus to specifications.

The market in cold-finished steel bars has not yet responded to the advance in hot-rolled bars, but business in the former is better and leading makers are understood to be considering an advance to a minimum of 1.90c. base, Pittsburgh. Intimations also are be-

ginning to be heard of a possible advance in wire nails.

Steel plant operations hold well up to the recent average with some increase noted in the Wheeling and Youngstown districts. The Carnegie Steel Co. has 35 of its 59 furnaces making iron and has issued orders for the blowing in of six more stacks. Its active ingot capacity last week averaged 72 per cent of capacity and an equally good showing is expected this week. This company recently put on a 72-in. and a 110-in. plate mills at Homestead, Pa., which had been down for about a year. The American Sheet & Tin Plate Co. has about 90 per cent of its sheet mills scheduled for the week and about 80 per cent of its tin plate mills. Other Steel Corporation subsidiaries are doing at least 70 per cent of capacity.

The pig iron market shows increased strength and sales of foundry iron are noted at advances of 25c. to 50c. per ton over recent prices. The scrap market also is advancing, due to increased demands for melting and distinct from stocking. The fuel market has become unsettled by the fact that at a number of mines in the Connellsville district the men have stayed away from work and operation has been suspended. The men have made no demands upon the operators

and their absence generally is ascribed to the activity of union organizers in threatening violence in case the men went into the mines. It is generally expected that the mines which have shut down will resume shortly.

Pig Iron.—The market continues to show a fair degree of activity in foundry iron, sales of which during the past week have been at least 10,000 tons. The bulk of the Valley iron, or what sold on a Valley furnace basis, has been moved at \$19 for the base grade, but we note the sale of one lot of 1000 tons to a Pittsburgh district consumer at \$19.25, Valley furnace basis. Practically all makers now are asking \$19.50 for No. 2 plain and a western Pennsylvania furnace interest has obtained that price on business to a point with low freight rate. We note a sale of 1000 tons of gray forge iron at a price delivered Pittsburgh, the equivalent of \$18.86, Valley furnace. The common asking price on basic now is \$18.50, Valley furnace, and the next sale is likely to develop that price or very close to it. Bessemer is firmly held by Valley furnaces at \$19.50. W. P. Snyder & Co. make the average price of Valley Bessemer iron for March \$19.388, as against \$19.50 in February, and of basic \$18 as against \$17.75 the previous month.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.96 per gross ton:

Basic	\$18.00 to \$18.50
Bessemer	19.50
Gray forge	18.75 to 19.00
No. 2 foundry	19.00 to 19.50
No. 3 foundry	18.75 to 19.00
Malleable	19.00 to 19.50

Ferroalloys.—Inquiries aggregating about 3000 tons of 80 per cent ferromanganese are before the trade from steel makers in this and nearby districts. Actual business is rather light, however, because of the uncertainty which still exists regarding the metal and ore paragraphs in the new tariff. English makers of ferromanganese recently advanced the price to \$65, c.i.f. Atlantic seaboard for 80 per cent material, and this change has been met by leading domestic makers. The latter, however, as a rule, have accepted such business as has been up at the old base of \$62.50. The new quotation, therefore, is merely an asking price. A Valley steel maker has just closed for 1000 tons of 20 per cent spiegeleisen for delivery at the rate of 200 tons a month, beginning next month, at about \$34, delivered Youngstown, the freight being \$6.64. The Central Steel Co., Massillon, Ohio, is reported to have bought 2500 tons of spiegeleisen, this tonnage being sufficient for about five months' requirements. A Cleveland interest wants 400 tons and there is an inquiry for 100 tons from a Dayton, Ohio, melter. Interest in 50 per cent ferrosilicon by consumers is extremely limited, probably because most of them are covered by contracts against their requirements for the next few months. Large tonnages of 20 per cent spiegeleisen can be bought as low as \$26.50 furnace, or slightly less than \$32, delivered this district, but for small lots \$30, furnace, or a little less than \$36 delivered is asked. Prices otherwise are unchanged.

We quote 78 to 82 per cent ferromanganese, \$62.50 to \$65 c.i.f. Atlantic seaboard for domestic and English. Average 20 per cent spiegeleisen, \$26.50 to \$30 furnace; 16 to 19 per cent, \$26.50 to \$29 furnace; 50 per cent ferrosilicon, domestic, \$55 to \$60 furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, \$36.50; 11 per cent, \$39.80; 12 per cent, \$43.10; 13 per cent, \$47.10; 14 per cent, \$52.10; silvery iron, 6 per cent, \$25; 7 per cent, \$26; 8 per cent, \$27.50; 9 per cent, \$29.50; 10 per cent, \$31.50; 11 per cent, \$34; 12 per cent, \$36.50. The present freight rate from Jackson to New Straitsville, Ohio, into the Pittsburgh district is \$4.06 per gross ton.

Iron and Steel Pipe.—Shading of card discounts has very largely, if not entirely, disappeared, and with the greater stability to the market has come an increased disposition on the part of distributors to buy. A number of makers not only have withdrawn cut prices but are advising the trade that only definite orders carrying specifications for early shipment will be accepted. Card discounts are given on page 971.

Billets, Sheet Bars and Slabs.—All makers are standing firmly by the advance recently established and some rather attractive inquiries for billets have failed to weaken prices, at least of open-hearth steel. Business taken prior to the recent increase in prices is sufficient to absorb production for this month and next and the available supply is further reduced by the increased

demand for finished products upon makers. The new prices as yet have not found much basis in sales, but at the moment there is no shading of them. The situation in Bessemer steel is not so strong as that in open hearth steel, but both grades are quoted at the same prices. We note the sale of 1000 tons of Bessemer steel bars at \$31, Pittsburgh, for prompt delivery.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at \$29.50 to \$30; 2 x 2-in. billets, \$31; Bessemer and open-hearth sheet bars, \$31; slabs, \$30 to \$30.50; forging billets, ordinary carbons, \$34.50 to \$37.00, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Consumers having been allowed to cover fairly freely prior to the recent advance of \$2 per ton, there naturally is not much basis as yet for the new quotation, but makers are so heavily committed that they are not eager for more business at less than the new figure. Prices are given on page 971.

Steel Skelp.—Hardly enough business is being done to definitely establish prices, but makers quite generally are quoting 1.50c. on pipe skelp and improvement in the market for tubular goods is sufficiently marked to make business at that price an early possibility. Most of the recent sales, however, have been at 1.40c. to 1.45c.

Wire Products.—Business still is good in nails and plain wire and there is a fair sprinkling of orders for barbed wire and fence. In spite of the appreciation in prices of farm products, the farmers are not yet buying freely. Manufacturers are taking contracts from jobbers at \$2.40 for nails, and this price is extremely firm with a possibility of an early advance since at this price nails are considerably out of the usual alinement with plain wire. The present spread of 15c. between plain wire and nails either means that nails are too low or wire is too high, and with rods at \$38 a ton there is no admission that wire is too high.

We quote wire nails at \$2.40 base per keg, Pittsburgh, and bright basic and Bessemer wire at \$2.25 base per 100 lb., Pittsburgh.

Boiler Tubes.—Business still is on a rising scale and while observance of the quoted discounts still is rather lax, concessions are not as great as they were a few weeks ago. Card discounts are given on page 971.

Sheets.—The American Sheet & Tinplate Co. has not yet followed the recent advances announced by the Wheeling Steel Corporation, which have been followed by most of the other independents. The effect of the higher prices has been to stimulate purchases and both the independents and the American Sheet & Tinplate Co. have benefited. The latter, last month, had the largest booking of orders carrying definite shipping specifications of any month since June, 1920, and shipments last month were the heaviest of any month since March, 1920, the month prior to the railroad strike. So much business has been entered at 3c. base for black and 4c. base for galvanized that the higher quotations now asked by most independents have no basis in sales. Prices are given on page 971.

Tin Plate.—There has been a general withdrawal of quotations of less than \$4.75 per base box, Pittsburgh, on new business because makers are well committed and also because of the higher prices now prevailing for tin bars and a lack of stock tin plate to compete with production tonnages. This does not mean that the usual preferentials to large consumers have been withdrawn.

We quote standard production coke tin plate, \$4.75 per base box f.o.b. Pittsburgh for carload lots.

Iron and Steel Bars.—The market on steel bars is thoroughly established at 1.50c. base, Pittsburgh, on new business, as protections at lower figures have practically all expired and most makers have sufficient business to be indifferent to new orders except at the full price. There is no change in iron bars, but the demand is better and makers are firmer within the quoted range.

We quote steel bars rolled from billets at 1.50c.; reinforcing bars, rolled from billets, 1.50c. base; reinforcing bars, rolled from old rails, 1.40c.; refined iron bars, 2c. to 2.10c. in carloads, f.o.b. mill, Pittsburgh.

Plates.—Observance of 1.50c., Pittsburgh, now is common among all of the independent makers, but large inquiries are lacking, and it is still uncertain whether this price would be insisted upon for a really

large tonnage. Tank and barge builders lately have not been getting much business, but railroad car builders here have begun to benefit by purchases by Eastern railroads. The Pressed Steel Car Co. has been awarded 75 passenger cars by the Pennsylvania Railroad, which has placed 50 cars with the Standard Steel Car Co. and 65 cars with the American Car & Foundry Co. The total order placed by the Pennsylvania Railroad is for 250 passenger, combination passenger and baggage, and combination baggage and mail cars. It is estimated that about 2500 tons of heavy sheets or light plates will be wanted.

We quote sheared plates, $\frac{1}{4}$ in. and heavier, tank quality, at 1.40c. to 1.50c., f.o.b. Pittsburgh.

Spikes and Track Bolts.—The Republic Iron & Steel Co. has announced an advance to \$2.25 base per 100-lb. for standard spikes and to \$2.50 base for 100-lb. for small spikes and boat and barge spikes. These prices represent advances of \$5 and \$7, respectively, per ton over recent going prices. The Lackawanna Steel Co. is understood to have taken a similar step and it is probable that other makers will follow suit, as it is claimed that recent prices showed losses as great as the advance just made by the Republic company. The most recent business placed here involves 1000 kegs and the price was \$2 base, per 100-lb. Makers of track bolts are trying to stabilize the market on a base of \$3 per 100-lb. for carload, but the effort has not yet made much headway. Prices are given on page 971.

Structural Material.—Low price protection having generally expired as of last Saturday, the market may now be said to be well established at 1.50c. base, Pittsburgh. Structural mills are fairly fully occupied and a fair amount of structural business is coming to fabricating shops here and in nearby districts. The American Bridge Co. has taken 400 tons for an office building for the Woodward-Larned Realty Co., Detroit. The Jones & Laughlin Steel Co. will furnish 100 tons for a dormitory at St. Vincents Abbey, Beatty, Pa. The Pittsburgh Bridge & Iron Co. has taken 100 tons for a building for the Wilson Tool Co., Sharon, Pa., and the Fort Pitt Bridge Works has taken a like amount for the Houston School, Washington, Pa. The Riverside Bridge Co. will fabricate the steel for a new Y. M. C. A. building at Columbus, Ohio, taking 525 tons and also for a new slag crushing plant for the Standard Slag Co., Bellaire, Ohio, requiring 200 tons. The J. E. Moss Iron Works, Wheeling, will furnish 400 tons of steel for an 8-story office building at Highpoint, N. C., R. K. Stewart & Son, general contractors; 350 tons for an 8-story hotel in Wheeling and 280 tons for a 6-story store building, R. R. Kitchen & Co., Wheeling, being the general contractors for these projects. Plain material prices are given on page 971.

Cold-Finished Steel Bars and Shafting.—While a larger amount of business is being offered makers, it is impossible to report any strengthening in prices as a result either of that fact or the definitely higher price of hot-rolled bars. The market still is quoted generally at 1.80c. to 1.90c. base, Pittsburgh, but it is reported that less than the lower figure has been done on attractive tonnages. A movement, however, is on foot among leading makers to re-establish 1.90c. as a minimum, thus restoring the usual recent spread between hot-rolled and cold-finished bars. Ground shafting is unchanged at 2.25c. base, mill, for carload lots.

Steel Rails.—There has been some stiffening in the price ideas of makers of light rails, rolling them from new steel, and while the demand is not especially brisk, there is no disposition now to name a price of less than 1.45c. base and some makers even are asking 1.50c.

We quote 25 to 45-lb. sections, rolled from new steel, 1.45c. to 1.50c. base; rolled from old rails, 1.35c. to 1.40c. base; standard rails, \$40 per gross ton mill for Bessemer and open-hearth sections.

Hoops and Bands.—The market does not show much activity, but makers are firm at 1.90c. base, Pittsburgh, for hoops, and some are also trying to get that price for bands.

Hot-Rolled and Cold-Rolled Strips.—On new business all makers are asking and insisting on a price of 1.90c. base, Pittsburgh, and some business is being

entered at that price, although most of the current shipments are on orders carrying \$1 to \$3 per ton less. Cold-rolled strips are firm at 3.50c. base, Pittsburgh.

Nuts and Bolts.—Orders show a gradual but steady increase, and while prices are no higher, sales are being made nearer quotations than was the case recently. Discounts are given on page 971.

Rivets.—The market is better as regards both prices and orders. While it is not disputed that occasional sales of heavy rivets are being made as low as \$2 base, per 100 lb., prices below that have disappeared and large makers quoting \$2.10 and \$2.20 are getting a goodly number of contracts. Prices and discounts are given on page 971.

Coke and Coal.—Because the strike of the union coal miners has spread, at least temporarily, into the non-union fields, some uncertainty has crept into the local fuel situation and on such business as has lately been done somewhat higher prices than ruled last week have been paid. Spot furnace coke now is quotable at \$3.40 to \$3.50 per net ton ovens, and spot foundry coke has commanded \$4.50 per net ton ovens on recent transactions. Mine run non-union coal has brought as high as \$2 per net ton on purchases against sales made by some interests whose mines had to shut down because too few men reported to keep them going. It is too early to state definitely the full effect of the strike of union miners upon non-union workings.

Old Material.—The market has had a further advance of at least 50c. per ton in the open-hearth grades on sales to consumers, and it is possible that before the week ends, still higher prices will be reached, because the increased demand for finished steel is forcing purchases of scrap and dealers, anxious to get the market up to a point where they can unload yard stocks at a profit, do not hesitate to pay extremely high prices on current offerings. In many cases the dealers recently have paid 25c. to 50c. a ton above the price at which they had sold the material, for railroad offerings. Although \$16.50 seems to be as high as any of the mills have paid for heavy melting steel, dealers have gone as high as \$17 and melters who are obliged to have additional tonnages now would have to pay at least the latter figure. Other grades of open-hearth material have advanced in keeping with heavy melting steel.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows per gross ton:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh.....	\$16.00 to \$16.50
No. 1 cast, cupola size.....	16.50 to 17.00
Re-rolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.....	15.00 to 15.50
Compressed sheet steel.....	14.00 to 14.50
Bundled sheets, sides and ends.....	13.00 to 13.50
Railroad knuckles and couplers.....	16.50 to 17.00
Railroad coil and leaf springs.....	16.50 to 17.00
Low phosphorus standard bloom and billet ends.....	17.50 to 18.00
Low phosphorus plates and other grades.....	17.00 to 17.50
Railroad malleable.....	13.50 to 14.00
Iron car axles.....	23.00 to 24.00
Locomotive axles, steel.....	21.00 to 22.00
Steel car axles.....	16.50 to 17.00
Cast iron wheels.....	16.00 to 16.50
Rolled steel wheels.....	16.50 to 17.00
Machine shop turnings.....	11.25 to 11.75
Sheet bar crop ends.....	16.00 to 16.50
Heavy steel axle turnings.....	13.50 to 14.00
Short shoveling turnings.....	13.00 to 13.50
Heavy breakable cast.....	16.00 to 16.50
Stove plate.....	13.00 to 13.50
Cast iron borings.....	13.00 to 13.50
No. 1 railroad wrought.....	12.50 to 13.00

Plate Mill Ordered

The Youngstown Sheet & Tube Co. has just placed the order with the Mackintosh-Hemphill Co., Pittsburgh, for a universal plate mill to replace one of older design now in use.

Mattie Furnace of A. M. Byers Co., Girard, Ohio, went out of blast March 30. The Shenango Furnace Co. will blow out No. 3 furnace with a capacity of 12,000 tons a month, and put on No. 1 furnace with a monthly capacity of 15,000 tons this week.

Chicago

CHICAGO, April 4.

The rapidity with which the iron and steel market is reviving is a source of surprise to many experienced observers who looked for a slow recovery, but nothing of a spectacular character. Buying of both steel and pig iron, however, has become brisk and tonnages placed are substantial, recalling the days before the depression set in. One of the most unusual features of the situation is that there is little forward buying in the sense that users are covering their anticipated needs. In most cases purchases are to apply against orders already on the books of consuming manufacturers. A month or two ago, the most prominent buyers were the carbuilders and the railroads. To-day liberal orders are coming from a wide variety of users and even the farm implement makers are buying to fill out their stocks of raw material in anticipation of a resumption in production. The building industry, which has been lying dormant for so long, has taken on a new lease of life. Large fabricating awards are being made and in some instances to forestall further advances in steel prices bids are being taken on the basis of preliminary sketches, the plans for the structures not having been completed. The automobile industry is rapidly swinging up toward a full operating rate, showing recuperative powers which were hardly expected.

The marked change in demand for steel is indicated by the fact that an important local producer booked more tonnage last week than in June, July and August of last year combined. Prices are firmer, wire rods having advanced \$2 a ton, and advances in plates, structural steel, wire and nails being expected. Production continues to expand. The Illinois Steel Co. has blown in its sixteenth furnace and is making steel at a slightly better rate than a week ago. Merchant pig iron output is also about to increase, with a second Iroquois furnace going in this week and a third scheduled to be blown in the near future. The coal strike has had no apparent effect on the market situation.

Pig Iron.—Demand is active and buying is in larger tonnages than has been the case since 1920. Orders ranging from 500 to several thousand tons are no longer exceptional and inquiries coming in from practically all directions indicate that the need for iron is general. Even the agricultural implement makers are placing orders to complete their stocks preparatory to a resumption of production, one company, in fact, having bought 1500 tons. An unusual feature of the situation and one indicating the strength is the fact that most current orders are being placed to cover actual needs of users as represented by orders on their books. There is little contracting ahead to cover anticipated requirements and in fact furnaces are not anxious to take on such commitments at present prices. New business booked by the leading Northern merchants has leaped ahead of production, with the result that additional blast furnace capacity must be employed, a second Iroquois furnace being scheduled to go in this week with an additional stack likely to be blown in the near future. Prices on local iron are firm at \$20, furnace, and Southern iron likewise is showing strength, most producers having announced advances to \$16 base, Birmingham. One maker still remaining on a \$15 base is expected to follow other producers some time this week. The furnace shipping by water and rail will still have an advantage of \$2 in freight, bringing its delivered price in Chicago to \$21.06. Some substantial orders were booked by this producer, as well as by other Southern makers, prior to the advance, among them orders for 1500 and 1200 tons of foundry respectively placed by Milwaukee foundries, an order for 500 tons placed by a Chicago melter and a like tonnage bought by a downstate user. Current inquiries are numerous, conspicuous among them being one for 15,000 tons of foundry from a railroad equipment manufacturer. A recently published report that the Lackawanna Steel Co. has sold from 12,000 to 20,000 tons of foundry for shipment in its own boats to

Chicago for distribution through a local broker is denied.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago.....	\$26.00
Northern coke, No. 1, sil. 2.25 to 2.75	20.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25.....	20.00
Northern high phos.....	20.00
Southern foundry, sil. 1.75 to 2.25.....	\$21.06 to 22.67
Malleable, not over 2.25 sil.....	20.00
Basic.....	20.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free.....	30.00
Silvery, sil. 8 per cent.....	32.82

Ferroalloys.—Ferromanganese has generally advanced to \$65 seaboard. A number of sales of spiegel-eisen ranging from 100 to 300 tons have been closed at the market.

We quote 78 to 82 per cent ferromanganese, \$73.40, delivered; 50 per cent ferrosilicon, \$56 to \$57.50, delivered; spiegeleisen, 16 to 18 per cent, \$40.10, delivered.

Railroad Equipment.—The Chicago & Northwestern has rejected all bids on its 2600 freight cars. The Northern Pacific has ordered 1000 refrigerator cars from the American Car & Foundry Co. The Pennsylvania has let 250 passenger service cars as follows: 75 coaches to Pressed Steel Car Co., 65 to American Car & Foundry Co., 50 to Standard Steel Car Co., 25 baggage and mail to Pullman Co., 35 passenger and baggage to Bethlehem Steel Co.

Bars.—Finding that prompt deliveries are no longer easily obtainable, hand-to-mouth buying is being abandoned and many users are purchasing liberally for stock. While there is no forward buying in the sense that mills will accept contracts covering future periods, much of the business now being taken for delivery at mills' convenience will not be rolled until June. Producers are not anxious to book business for third quarter at present prices. Demand is general and the market on mild steel bars remains firm at 1.60c., Chicago. Bar iron is not so active as soft steel, but prices remain steady. Hard steel bar mills continue to operate single turn with several weeks of business ahead.

Mill prices are: Mild steel bars, 1.60c., Chicago; common bar iron, 1.60c., Chicago; rail carbon, 1.50c., mill or Chicago. Jobbers quote 2.28c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.15c. for rounds and 3.65c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 1.90c. base. Deformed bars, 1.75c. to 2c. Hoops, 3.13c. Bands, 2.88c.

Warehouse Prices.—Local jobbers are expected to announce an advance in sheets this week.

Wire Products.—Buying continues to expand and it is notable that there is an increasing tendency on the part of jobbers to pile stocks. Reported advances in wire nails and wire by the leading producer are denied, but the market is very firm and an early announcement of higher prices would not be surprising. Wire rods have advanced \$2 per ton. For mill prices, see finished iron and steel, Pittsburgh, page 971.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, \$2.85 per 100 lb.; No. 9 and heavier bright basic wire, \$3 per 100 lb.; common wire nails, \$3 per 100 lb.; cement coated nails, \$2.50 per keg.

Rails and Track Supplies.—Demand for track materials continues brisk, but prices do not yet show the evidences of strength to be noted in other steel commodities. While some late business has gone at concessions, tie plates appear to be growing firmer and two local producers announce that no further orders will be booked at less than \$35, mill. Bolts and spikes are still soft. The Northern Pacific has placed 5000 tons of tie plates with the Gary mill and the Grand Trunk has divided a substantial order among the Lundie, Sellers and Interstate companies. The Nickel Plate has placed 6000 tons of rails with the Gary mill, 1000 with Inland and 3000 with Lackawanna, and is expected to order 2000 tons more.

Standard Bessemer and open hearth rails, \$40; light rails rolled from new steel, 1.50c., f.o.b. makers' mills. Standard railroad spikes, 1.90c. to 2c., Pittsburgh; track bolts with square nuts, 3c. to 3.05c., Pittsburgh; tie plates, steel and iron, 1.65c. to 1.75c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Bolts and Nuts.—The Ford Motor Co. has closed for 12,000,000 nuts and other items in proportion. Other

automobile makers are also buying liberally. The motor car industry is active and rapidly swinging into full production. The Ford company is operating at 75 per cent of capacity while a number of others, including Dodge, Chevrolet and Hudson, are reported to be on a 100 per cent basis. Demand for bolts and nuts is generally better, and while price weakness has not entirely disappeared, there is an increasing tendency on the part of sellers to adhere strictly to the discounts on page 971, quoting f.o.b. Pittsburgh or Chicago, depending on which city is nearer the point of consumption. The only quotation on page 971 which does not seem to be general here is that on stove bolts, 85 and 10 and 5 and 80 and three tens for bolts in packages being commoner discounts.

Jobbers quote structural rivets, 3c.; boiler rivets, 3.10c.; machine bolts up to $\frac{3}{4}$ x 4 in., 60, 10 and 10 per cent off; larger sizes, 60 and 10 off; carriage bolts up to $\frac{3}{4}$ x 6 in., 80 and 10 off; larger sizes, 55 and 5 off; hot pressed nuts, square and hexagon tapped, \$3.75 off; blank nuts, \$4 off; coach or lag screws, gimlet points, square heads 65 and 5 per cent off. Quantity extras are unchanged.

Plates.—The Sinclair Crude Oil Purchasing Co. has placed 25 80,000 bbl. oil storage tanks for erection at Mexia, Tex.; Humboldt, Kan.; Healdton, Okla.; and Cushing, Okla.; with the Chicago Bridge and Iron Works. It has also ordered five tanks from the Graver Corporation. All of the steel involved, amounting to 9000 tons, will be furnished by the Illinois Steel Co.

The mill quotation is 1.60c., Chicago. Jobbers quote 2.38c. for plates out of stock.

Structural Material.—A marked change has occurred in the construction field within the past few weeks. Inquiries and lettings are increasingly numerous and projects are being rushed to head off further advances expected in plain material. Bids have already been taken on the Stevens Hotel, Chicago, involving about 15,000 tons, although the plans have not yet been completed. Figures are also expected to be submitted on the basis of preliminary sketches for the Stratford Hotel, Chicago, requiring about 4000 tons. An early advance on plain material, putting it about \$2 above bars, is regarded likely. Fabricating awards include:

Morton Hotel, Grand Rapids, Mich., 2000 tons, to Fort Pitt Bridge Works.

Union Oil Co. Building, Los Angeles, 1800 tons, to American Bridge Co.

Penstock in southern California, 1312 tons, to Kellogg Co., New York.

University of Illinois Stadium, Urbana, 1100 tons, to Fort Pitt Bridge Works.

American Medical Association Building addition, 1000 tons, to Hansell-Elcock Co.

Interior Furnishings Co. Building, Chicago, 950 tons, to Duffin Iron Works.

First National Bank Building, Albuquerque, N. M., 528 tons, reinforced concrete construction substituted.

Willamette River bridge, Clackamas County, Oregon, 467 tons, to McClintic-Marshall Co.

Masonic Temple, Aurora, Ill., 424 tons, to Union Foundry Co.

Oak Park Club Building, Oak Park, Ill., 275 tons, to American Bridge Co.

E. T. Williams Oil Co., tank, Casper, Wyo., 209 tons, to American Bridge Co.

Machine shop for Navy Department, San Diego, Cal., 184 tons, reinforced concrete construction substituted.

United States Gypsum Co., addition to panel board plant, Oakfield, N. Y., 103 tons, to Lackawanna Bridge Works Corporation.

Montreal Mining Co., Hurley, Wis., shaft sets, 100 tons, to Warden-Allen Co.

Pending business includes:

Burlington Railroad, new shops at Denver, 2130 tons.

Masonic Temple, Salina, Kan., 1000 tons.

North Main Street Subway, Houston, Tex., 600 tons.

Western Electric Co., buildings, 156 and 157 tons.

Hawthorne, Ill., 450 tons.

Chicago, Burlington & Quincy, miscellaneous bridges, 2,560 tons.

Addition to Chambers Estate Building, Kansas City, 230 tons.

Masonic Temple, Duluth, 200 tons.

The mill quotation on plain material is 1.60c., Chicago. Jobbers quote 2.38c. for plain material out of warehouse.

Cast-Iron Pipe.—The United States Cast-Iron Pipe & Foundry Co. is low bidder at Milwaukee on 6750 tons of 54 and 36-in. and 180 tons of special castings, its tender on the straight pipe being \$40.86, delivered.

The award is delayed pending consideration of steel pipe as an alternative proposition. Pending business includes: Lansing, Mich., 500 tons; Bay City, Mich., 700 tons, bids to be in April 7; Cleveland, 2000 tons, April 12; Maumee County, Toledo, 200 tons, April 10.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., \$46.10 to \$47.10; 6-in. and above, \$42.10 to \$43.10; class A and gas pipe, \$3 extra.

Reinforcing Bars.—The general expectation that steel prices will again advance has resulted in the closing of numerous building projects. In an effort to get under cover, architects who are not yet ready to place building contracts are contracting for their steel. Thus Rapp & Rapp, Chicago, placed 1000 tons with the Inland Steel Co. for a projected structure at Fifty-sixth and Cornell streets, and Alfred S. Alschuler contracted for 800 tons for two operations the identity of which he has not disclosed. Recent contracts include:

University of Illinois Stadium, Urbana, 1600 tons, to Corrugated Bar Co.

Swigart Paper Co. Building, Chicago, 400 tons, to Concrete Steel Co.

Bridge, Iron Mountain, Mich., 300 tons, to Concrete Engineering Co.

Hudson Motor Car Co., sales building, Chicago, 450 tons, to Paul J. Kalman Co.

Chicago, Burlington & Quincy, 150 tons, to Corrugated Bar Co.

Robert Fulton School, Minneapolis, 100 tons, to C. A. P. Turner Co.

Pending business includes:

Stevens Hotel, Chicago, 1000 tons.

Sheets.—Independents have generally advanced blue annealed, black and galvanized \$3 a ton and the Steel Corporation mill is expected to follow. Business is brisk and mills are sold from 40 to 60 days ahead on most gages. The small orders which producers have been taking have piled up to such an extent that customers who expected delivery in the latter part of April and in May may be disappointed. New business is in larger tonnages, but mills are not willing to take third quarter contracts at present prices.

Mill quotations are 3c. to 3.15c. for No. 28 black, 2.25c. to 2.40c. for No. 10 blue annealed and 4c. to 4.15c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stock, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c.

Old Material.—Heavy steel mill purchases at advanced prices have accentuated the bullish aspect of the market. One independent mill placed 15,000 tons of heavy melting at \$13.25 per gross ton delivered. Further buying of open-hearth grades is looked for in view of the rapid expansion of the demand for finished steel products. Speculative activity by dealers is still the dominant feature of the market, consumptive buying of iron mill, cast and malleable grades being light. A large consumer, however, has bought 500 tons of cast iron car wheels at \$18.25 per gross ton delivered and another purchase at \$17.75 was also made.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails	\$17.00 to \$17.50
Relaying rails	20.00 to 25.00
Cast iron car wheels	17.75 to 18.25
Rolled or forged steel car wheels	14.75 to 15.25
Steel rails, rerolling	14.00 to 14.50
Steel rails, less than 3 ft.	14.00 to 14.50
Heavy melting steel	13.00 to 12.50
Frogs, switches and guards cut apart	13.00 to 13.50
Shoveling steel	12.75 to 13.25
Low phos., heavy melting steel	15.00 to 15.50
Drop forge flashings	9.00 to 9.50
Hydraulic compressed sheet	9.50 to 10.00
Axle turnings	9.50 to 10.00

Per Net Ton

Iron angles and splice bars	15.00 to 15.50
Steel angle bars	12.25 to 12.50
Iron arch bars and transoms	16.50 to 17.00
Iron car axles	30.00 to 30.50
Steel car axles	13.75 to 14.25
No. 1 busheling	9.50 to 10.00
No. 2 busheling	6.25 to 6.75
Cut forge	11.50 to 11.75
Pipes and flues	8.00 to 8.50
No. 1 railroad wrought	11.75 to 12.00
No. 2 railroad wrought	11.50 to 11.75
Steel knuckles and couplers	13.50 to 14.00
Coil springs	13.75 to 14.25
No. 1 machinery cast	14.25 to 14.75
No. 1 railroad cast	13.75 to 14.25
Low phos. punchings	11.50 to 12.00
Locomotive tires, smooth	11.25 to 11.75
Machine shop turnings	5.75 to 6.25
Cast borings	7.75 to 8.25
Stove plate	13.00 to 13.50
Grate bars	11.50 to 12.00
Brake shoes	11.50 to 12.00
Railroad malleable	13.25 to 13.75
Agricultural malleable	13.25 to 13.75

New York

NEW YORK, April 4.

Pig Iron.—The market has been very active the past week and prices have shown a hardening tendency and some stiff advances by companies which are not anxious to take orders at the present time. For example, one steel company will have no more iron until June and is quoting \$20, furnace, for No. 2X. Another steel company is quoting \$19 for No. 2 plain, \$19.50 for No. 2X and \$20 for No. 1. Merchant furnaces are hoping that the present policy of steel companies indicates the early departure of some of them from the market as sellers of foundry iron, but one is expected to be permanently in the foundry iron field, as it announced when it started to sell foundry iron last year. A more moderate advance has been made by a merchant firm which had been selling No. 2X and No. 2 plain at \$18, furnace. Its present schedule is \$18 for No. 2 plain, \$18.50 for No. 2X and \$19 for No. 1. This firm sold 4500 tons last week and about 4000 tons the first two days of this week. The company which was sounding the market for 1500 tons per quarter for the remainder of the year did not succeed in buying for the fourth quarter and had difficulty in getting the desired tonnage for the third quarter. This experience shows the policy of most furnaces not to quote for late delivery. Pending inquiries include one of 2000 tons for second and third quarter, 1500 tons for third quarter, 900 tons for second quarter, 500 to 1000 tons for second quarter and numerous smaller lots.

We quote delivered in the New York district as follows, having added to furnace prices \$2.52 freight from eastern Pennsylvania, \$5.46 from Buffalo and \$6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	\$23.02 to \$23.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	22.52 to 23.02
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	22.02 to 22.52
Buffalo, sil. 1.75 to 2.25	23.46 to 23.71
No. 2 Virginia, sil. 1.75 to 2.25	28.16

Ferroalloys.—Domestic producers of ferromanganese advanced prices yesterday to \$65, basis seaboard. It is probable that British sellers will also raise their quotations. Demand for ferromanganese is moderately active and there are inquiries before the market amounting to about 4000 tons, one involving 3000 tons for delivery over the remainder of the year. Moderate sales have been made during the week. A moderately active business has been done in spiegeleisen, but quotations remain unchanged. There have been no developments in the manganese ore market where quotations are still nominal. A moderate business has been done in 50 per cent ferrosilicon at prevailing quotations. Quotations are as follows:

Ferroalloys

Ferromanganese, domestic, seaboard, per ton	\$65.00
Ferromanganese, British, seaboard, per ton	\$62.50
Spiegeleisen, 16 to 19 per cent, furnace, per ton	\$29.00
Spiegeleisen, 20 per cent	\$30.00
Ferrosilicon, 50 per cent, delivered, per ton	\$57.00 to \$60.00
Ferrotungsten, per lb. of contained metal, 40c. to 50c.	
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	13c.
Ferrovanadium, per lb. of contained vanadium	\$4.00
Ferrocobaltititanium, 15 to 18 per cent, net ton	\$200.00
Ferrocobaltititanium, 15 to 18 per cent, 1 ton to carloads, per ton	\$220.00
Ferrocobaltititanium, 15 to 18 per cent, less than 1 ton, per ton f.o.b. Niagara Falls, N. Y.	\$250.00

Ores

Manganese ore, foreign, per unit, seaboard, 25c. to 26c.	
Tungsten ore, per unit, in 60 per cent concentrates	\$2.00 up
Chrome ore, 40 to 45 per cent Cr ₂ O ₃ , crude, per net ton, Atlantic seaboard	\$20.00 to \$25.00
Chrome ore, 45 to 50 per cent Cr ₂ O ₃ , crude, per net ton, Atlantic seaboard	\$25.00 to \$27.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS ₂ , New York	45c.

Finished Iron and Steel.—Improvement in steel trade continues. Diversification of orders is noted, there being a better demand for many of the special products, such as alloy bars, spring steel, forging bars, stay bolt iron, etc., while demand for the heavy tonnage products has also been in good volume during the past week. Most, if not all, of the independent steel companies are now quoting 1.50c., Pittsburgh, on plates, shapes and bars. Protections on lower quotations largely expired on April 1, and there are now few, if any, outstanding. No large orders are being placed at 1.50c., but there is a fair volume of small orders. A

Pittsburgh independent has notified its district sales office to take no more orders at any price without first submitting the inquiry to the general sales office. An independent company which last week was quoting 1.40c., Pittsburgh, on steel bars has followed the other independents and now is quoting 1.50c. Large orders for bars have been booked within the past week. The only real weakness is in plates, which some buyers say they can still secure at 1.45c., Pittsburgh, and very large buyers claim to be able to cover their requirements, where the tonnages are attractive, at 1.40c. The Buffalo & Susquehanna Railroad has inquired for 1350 tons of 85-lb. rails from its purchasing office at Wellsville, N. Y. Quite a number of new structural projects are up for bids, one of outstanding size covering 20 additional oil tanks for the Sinclair Consolidated Oil Corporation, requiring 6000 tons of steel. Other structural inquiries on which bids have gone in follow:

Genesee office building, Buffalo, 3000 tons.
High school building at Wilkes-Barre, Pa., 1200 tons.
Factory building for the Goodall Worsted Co., Sanford, Me., 2000 tons.
Department store for Miller & Rhoades, Richmond, Va., 2700 tons.
Hotel Francis Marion, Charleston, S. C., 800 tons.
Office building at New Haven, Conn., 800 tons.
Philadelphia & Reading railroad bridge over Schuylkill River, 500 tons.
Lehigh Valley Railroad, bridge material, 2500 tons, bids closing April 7.
Standard Oil Co. of Louisiana, 500 tons for delivery at North Baton Rouge, La.

Building for Oxford Paper Co., Rumford, Me., 600 tons.
Viaduct for Southern Railway, 300 tons, bids closed April 3.

Work that has been awarded during the past week includes the following:

Power house for Dayton Power & Light Co., Dayton, Ohio, 1600 tons, to Pittsburgh Bridge Works.
Store and office building at Broadway and 54th Street, New York, 1000 tons, to Paterson Bridge Co.
Theater and office building at Hartford, Conn., 300 tons, to an unnamed fabricator.
Loft building on West 36th Street, New York, 1100 tons, to Hinkle Iron Co.
Steel shields for New York-New Jersey vehicular tunnel, 10,000 tons, to Merchants Shipbuilding Corporation.

We quote for mill shipments, New York, as follows: Soft steel bars, 1.88c.; plates, 1.83c. to 1.88c.; structural shapes, 1.88c.; bar iron, 1.78c. On export shipments the freight rate is 28.5c. per 100 lb. and the domestic rate is 38c.

Railroad Equipment.—While the New York Central Railroad has not advertised for bids for freight cars, its informal inquiries have gone out to a number of car builders, each inquiry asking prices on 1000 or more cars of various types. It is reported that the number to be bought may total 15,000 as mentioned in THE IRON AGE last week. The Chesapeake & Ohio Railroad has issued formal inquiries for 1500 box cars and 200 stock cars of the total of 5250 cars for which it will inquire. The Louisville & Nashville will probably close this week for 1000 to 1500 freight cars. The Northern Pacific Railroad has placed an order for 1000 refrigerator cars with the American Car & Foundry Co. The Pennsylvania Railroad has ordered 250 passenger coaches, baggage and mail cars, divided among the following builders: Pressed Steel Car Co., 75 coaches; American Car & Foundry Co., 65 coaches; Standard Steel Car Co., 50 coaches; Harlan & Hollingsworth Corporation, 35 passenger and baggage cars; Pullman Co., 25 baggage and mail cars. The Southern Pacific has ordered 50 steel cars from the St. Louis Car Co. New locomotive orders include 25 for the Baldwin Locomotive Works from the Philadelphia & Reading. The Mobile & Ohio is inquiring for 10 Mikado engines.

High Speed Steel.—March has shown a slight improvement in business with some companies. One company reports that each month this year has shown about the same increase over the previous month and believes that the upward trend, though small, is permanent. Prices continue unchanged at from 75c to 85c per lb. for 18 per cent tungsten high speed steel and up to as high as \$1.05 per lb. on special brands of some companies.

Warehouse Business.—The improvement in business manifest throughout March is evidently well sustained. Most warehouses report March as the best month this year, from the standpoint of both size and number of

orders. The recent action of the leading interest in this district in reducing prices is causing considerable speculation as to the future, as the continued stiffening of mill prices to a 1.50c per lb., on shapes, plates and bars, Pittsburgh, base, leaves the spread at \$10, which, it is generally agreed is too low for profit. There is, in some quarters, a feeling that should the mill price of 1.50c per lb. be firmly established, a warehouse increase would be absolutely necessary, in order to give a more satisfactory spread, as the cost of doing business in this district is high. Sheet prices have stiffened considerably and strong efforts are being made by many warehouses to establish 3.85c or 3.90c per lb. on black sheets and 4.85c or 4.90c per lb. on galvanized sheets, No. 28 gage. In the meantime, however, small dealers continue to offer lots of both black and galvanized sheets at low prices. The leading independent interest and others still maintain 3.75c and 4.75c per lb. on Nos. 28, black and galvanized sheets. Brass and copper warehouses report sporadic buying as a rule, with the exception of buying by radio telephone manufacturers, which are steady through small consumers. Although business is reported to be better in wrought iron and steel pipe, the price situation is still weak. We quote prices on page 984.

Coke.—Despite the strike of coal miners, prices on beehive grades are somewhat easier and it is possible to buy foundry grades at \$4.25, although the usual quotations range from \$4.50 to \$5. By-product coke continues at \$8.84 for delivery to points on the Pennsylvania, Erie and Lackawanna railroads and \$9.09 to points on the Central of New Jersey.

Old Material.—The upward trend of the market continues fairly strong on heavy melting steel and railroad scrap, but on some other items is showing weakness, notably stove plate and other cast material. One dealer recently offered stove plate to a company in Mahwah, N. J., at \$13 per ton, equivalent to \$10.20 per ton New York, but was unable to close on this basis. Buying is still largely confined to western Pennsylvania mills. Bethlehem is now buying at \$12.25 per ton on No. 1 heavy melting steel and \$14.50 per ton on railroad scrap. It is reported that Cambria will again enter the market at from \$15.25 to \$15.50 per ton on heavy melting steel, Johnstown. Demand at present is probably strongest for railroad scrap, which is scarce and closely held by small dealers. As a result, while heavy melting steel is still quotable at \$9 to \$9.50 per ton, buying price New York, short length steel rails and re-rolling rails are both from \$10.50 to \$11 per ton New York.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard.....	\$9.00 to \$9.50
Steel rails, short lengths, or equivalent	10.50 to 11.00
Re-rolling rails	10.50 to 11.00
Relaying rails, nominal.....	27.00 to 28.00
Steel car axles.....	10.50 to 11.00
Iron car axles.....	18.50 to 19.00
No. 1 railroad wrought.....	11.00 to 11.50
Wrought iron track.....	10.00 to 10.50
Forge fire	5.50 to 6.00
No. 1 yard wrought, long.....	10.00 to 10.50
Cast borings (clean).....	7.00 to 7.50
Machine-shop turnings.....	6.00 to 6.50
Mixed borings and turnings.....	6.00 to 6.50
Iron and steel pipe (1 in. diam., not under 2 ft. long).....	8.50 to 9.00
Stove plate	10.00 to 10.50
Locomotive grate bars.....	10.50 to 11.00
Malleable cast (railroad).....	9.00 to 9.50
Cast-iron car wheels.....	10.50 to 11.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast.....	\$17.00 to \$17.50
No. 1 heavy cast (columns, building materials, etc.), cupola size.....	16.00 to 16.50
No. 1 heavy cast, not cupola size.....	14.00 to 14.50
No. 2 cast (radiators, cast boilers, etc.)	11.00 to 11.50

Cast-Iron Pipe.—The extraordinary activity in this market in both private and municipal purchases continues strong and there is a decided feeling of optimism. Prices continue stiff. Recent bids submitted on a municipal inquiry in New York, involving about 4500 tons of pipe with fittings, brought out prices but slightly lower than current quotations. This tender, from the Department of Water Supply, Gas and Electricity was divided into four sections. John Fox & Co. was the low bidder on section 1, 1088 tons of 4-in., 6-in., 8-in. and 12-in. pipe at a price of \$46.90 and 101 tons of fittings at \$105. Low bidder on section 2 was the

United States Cast Iron Pipe & Foundry Co., with a price of \$47.90 on 940 tons of 6-in., 8-in. and 12-in. pipe and \$110 for the 57 tons of fittings. The Warren Foundry & Machine Co. was low bidder on the 860 tons of 8-in. pipe, with a price of \$47.35 per ton and \$110 per ton on the 25 tons of fittings. Section 4, calling for 1450 tons of 6-in., 8-in. and 12-in. pipe brought out a price of \$47.90 per ton from the United States Cast Iron Pipe & Foundry Co. and \$110 per ton on the 43 tons of fittings. On April 5, the Department of Water Supply Gas and Electricity, New York, opened bids by contractors on about 316 tons of 6-in., 8-in. and 12-in. pipe and 600 tons of 6-in., 12-in., 20-in. and 30-in. pipe. Cast-iron pipe for the Hudson River tunnel probably will not be placed for some time, as it will not be used for about one year. We quote per net ton, f.o.b. New York, carload lots, as follows: 6-in. and larger, \$48.80; 4-in. and 5-in., \$53.80; 3-in., \$63.80, with \$4 additional for Class A and gas pipe.

Philadelphia

PHILADELPHIA, April 4.

In every department of the iron and steel trade, the improvement which became noticeable early in March has continued into April, the first three business days of this month showing a substantial volume of business. March was the best month in the steel trade since 1920. The Midvale Steel & Ordnance Co. during the month booked a tonnage equal to the total capacity of its Johnstown works and its shipments from Johnstown were equal to 76 per cent of capacity. Last week's bookings of sheets by some of the independent companies were very large. A Youngstown company during March put on its books the largest volume of sheet business it has ever taken out of this territory in one month, not excluding the war period. Many sheet companies have taken enough business for a very satisfactory operation throughout all of the second quarter, and in at least one instance a contract for sheets has been made for third quarter at the \$3 advance which became effective with a majority of producers on April 1.

Operations of Eastern steel plants show a steady gain. A few mills, particularly those rolling rails and tin plate, are operating at close to 100 per cent. The plate mills are not doing so well, their operations in this district varying from about 25 to 50 per cent. While many manufacturing consumers and jobbers have covered their requirements for 30 to 90 days at the recent low prices, there is much more business which has not yet developed to the point of bringing fresh inquiries for steel into the market. For example, locomotive builders are submitting prices on about 300 to 400 locomotives which railroads may soon buy.

The foundry pig iron market is firm, but sales of 10,000 or more tons of basic have developed a slightly lower delivered price. Consumers of foundry iron have tried unsuccessfully to cover for third quarter. Prior to an advance in ferromanganese to \$65, Atlantic seaboard, domestic makers booked orders for several thousand tons.

Scrap prices continue firm notwithstanding a slight lull in buying of some grades. Steel scrap is selling from \$13.50 to \$14.50, delivered at eastern Pennsylvania plants.

Pig Iron.—An Eastern steel company has bought 10,000 tons or more of basic iron from two furnaces at approximately \$20, delivered. This consumer has not been an active buyer for a considerable period. A Harrisburg consumer is also reported to have bought a few thousand tons of basic. No final disposition has been made of the order for foundry iron for the 48,000 tons of segments to be cast by the Davies & Thomas Co., Catasauqua, Pa., for the New York-New Jersey vehicular tunnel, but it is now reported that the iron may be furnished by the Bethlehem Steel Co. instead of by the Empire Iron & Steel Co. Several inquiries for foundry iron for third quarter from consumers in the New York district, principally heating equipment companies, is a new feature of the foundry iron market. So far only a limited tonnage has been entered into for that delivery, furnaces being hesitant regarding com-

mitments so far ahead. There is a fair volume of inquiry for delivery over the remainder of second quarter, including one from a Baltimore consumer for 1000 tons, but sales in the past week have been mostly small lots. Some buyers have tried unsuccessfully to increase the quantity of their recent orders taken at prices below those now quoted. The foundry iron market is firm at \$20, furnace, for No. 2 plain, \$20.50 for No. 2 X and \$21 for No. 1 X, and sellers, as a rule, no longer find it necessary to equalize freight rates. An advance to \$19, Buffalo, by a leading seller in that district will lessen price competition in the New York and New England districts. A malleable foundry is in the market for about 500 tons of iron of a special grade. A sale of 1000 tons of gray forge iron at \$20, delivered, was made last week.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to \$1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	\$20.84 to \$21.54
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.34 to 22.04
Virginia No. 2 plain, 1.75 to 2.25 sil.	26.24 to 26.74
Virginia No. 2X, 2.25 to 2.75 sil.	27.24 to 27.74
Basic delivery eastern Pa.	20.00 to 20.25
Gray forge	20.00 to 21.00
Malleable	22.50 to 24.00
Standard low phos. (f.o.b. furnace)	30.00
Copper bearing low phos. (f.o.b. furnace)	28.00

Ferroalloys.—Prior to an advance to \$65, Atlantic seaboard, domestic makers booked several thousand tons of ferromanganese at the former price of \$62.50. British makers will also advance to \$65, according to cables received to-day. Very little is being done in spiegeleisen in this district.

Semi-Finished Steel.—Eastern mills are now quoting \$29.50 to \$30, Pittsburgh, on open-hearth rerolling billets and \$34 to \$34.50 on forging billets. The new price of \$38, Pittsburgh, on wire rods is also in effect, but recent sales have been mostly at \$36.

Bars.—One independent maker of steel bars which held open its 1.40c. price longer than its competitors has now advanced to 1.50c., Pittsburgh, and the market generally is firm at that level. Considerable bar tonnage has been put on the books in the past week, though not all of it at 1.50c., many protections at 1.40c. having remained good until April 1. Bar iron makers have also stiffened their quotations and 1.45c., Pittsburgh, is now the general quotation. An independent maker of spring steel has advanced its extra from 15c. per 100 lb. to 25c. over the bar base. Cold-finished steel bars and shafting is still weak, most of the current business being taken at about 1.85c., Pittsburgh, which, however, is \$2 to \$3 a ton above recent low figures.

Sheets.—Most of the independent companies advanced prices on sheets \$3 a ton, effective April 1. Customers were permitted to cover at the old prices and large sheet orders were booked during the week. March sales of one prominent sheet manufacturer in this district were the largest of any month in five years. One contract was entered for third quarter shipment. Some companies gave their trade until April 5 to cover. Eastern mills have not sold so heavily as those in the Pittsburgh-Youngstown district. The new prices which most of the independent mills quote are 2.40c. for the blue annealed, 3.15c. for black and 4.15c. for galvanized, base Pittsburgh.

Track Supplies.—The Pennsylvania Railroad this week placed 100,000 tie plates, 2500 kegs of railroad spikes and 70,000 heat-treated bolts. Recently spikes have been sold at 2c., Pittsburgh, but one or two companies have advanced to 2.10c.

Warehouse Business.—A steady gain in sales of steel out of stock is reported by local jobbers. Black and galvanized sheets and deformed steel bars have been advanced. We quote for local delivery:

Soft steel bars and small shapes, 2.36c.; iron bars (except bands), 2.36c.; round edge iron, 2.55c.; round edge steel, iron finish, $1\frac{1}{2}$ x $\frac{1}{2}$ in., 2.55c.; round edge steel planished, 3.30c.; tank steel plates, $\frac{1}{4}$ -in. and heavier, 2.46c.; tank steel plates, $\frac{3}{16}$ -in., 2.61c.; blue annealed steel sheets, No. 10 gage, 3.25c.; black sheets, No. 28 gage, 4c.; galvanized sheets, No. 28 gage, 5c.; square twisted and deformed steel bars, 2.50c.; structural shapes, 2.46c.; diamond pattern plates, $\frac{1}{4}$ -in., 4.35c.; $\frac{3}{16}$ -in., 4.50c.; spring steel, 3.50c.; round cold-rolled steel, 3c.; squares and hexagons, cold-rolled steel, 3.50c.; steel hoops, No. 13 gage and lighter, 3.11c.; steel bands, No. 12 gage to $\frac{3}{16}$ -in., inclusive, 2.86c.; iron bands, 3.90c.; rails, 2.36c.; tool steel, 8c.; Norway iron, 5.50c.; toe calk steel, 4.50c.

Plates.—While plate mills have not enjoyed the increase in business that has come to mills rolling other products, there has been a decided gain in bookings and March was by far the best month since 1920. Plates are quoted by nearly all mills at 1.50c., Pittsburgh, and some companies will not shade this price even on the most attractive tonnages, but it is not denied that certain classes of buyers, such, for example, as the car companies, might be able to do 1.45c., Pittsburgh, on large lots. Locomotive companies are figuring on 300 to 400 locomotives, and while in most instances the formal inquiries have not been issued, it is expected that much of this work will be let by railroads within the next few months. The Chicago, Milwaukee & St. Paul has ordered 25 locomotives from the Baldwin Locomotive Works and will not buy at present the other 25 for which it inquired. The Baldwin works has also booked 12 additional locomotives for Brazil, making 16 in all within the past two weeks. Two Eastern mills have divided 12,000 tons of plates for the Seattle pipe line job, which has been in the market for many weeks. The pipe will be fabricated on the Pacific Coast. The Merchants Shipbuilding Corporation, Chester, Pa., will fabricate the shields for the New York-New Jersey vehicular tunnel requiring 12,000 tons of plates, which will be furnished by the Bethlehem Steel Co. Plate mills in the eastern Pennsylvania district average about 40 per cent in operation. Some of them have been urged to make contracts for all of second quarter but have declined to do so.

Structural Material.—A considerable volume of small work has been placed. The American Bridge Co. in the past six weeks has booked about 30,000 tons of fabricated steel in Philadelphia alone, which includes several large projects recently reported. A high school building at Wilkes-Barre, Pa., 1200 tons, will be fabricated by the Phoenix Bridge Co. Bids will close April 18 on two city piers, totaling 7000 tons. Plain material is firm at 1.50c., Pittsburgh, but fabricated steel prices have not stiffened. Recent pier work, totaling 7000 tons, is reported to have been taken at \$54, erected.

Old Material.—Germany's need for steel scrap is indicated by a cabled offer of \$16, c.i.f. Hamburg, for 10,000 tons a month. This met with a counter quotation of \$20, Hamburg, by a Philadelphia exporter. Demand for steel scrap in the East is confined almost entirely to one company, which is paying from \$13.50 to \$14.50, delivered. There is a lull in demand for some grades, but prices remain firm. A tonnage of iron car axles has been sold at \$30, delivered. We quote for delivery at consuming points in this district as follows:

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	\$13.50 to \$14.50
Scrap rails	13.50 to 14.50
Steel rails, rerolling	15.00 to 15.50
No. 1 low phos., heavy 0.04 and under	18.00 to 19.00
Cast iron car wheels	16.75 to 16.25
No. 1 railroad wrought	15.50 to 16.00
No. 1 yard wrought	13.50 to 14.00
No. 1 forge fire	10.50 to 11.00
Bundled sheets (for steel works)	11.50 to 12.00
No. 1 busheling	12.50 to 13.50
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	11.00 to 11.25
Mixed borings and turnings (for blast furnace use)	11.00 to 11.25
Machine-shop turnings (for rolling mill and steel works use)	11.50 to 12.00
Heavy axle turnings (or equivalent)	12.00 to 12.50
Cast borings (for steel works and rolling mills)	12.00 to 12.50
Cast borings (for chemical plants)	15.00 to 16.00
No. 1 cast	17.00 to 17.50
Railroad grate bars	14.00 to 14.50
Stove plate (for steel plant use)	14.00 to 14.50
Railroad malleable	13.00 to 13.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.50 to 14.00
Shafting	18.50 to 19.00

At the annual meeting of the stockholders of the Riverside Bridge Co., held at the main office of the company, Martins Ferry, Ohio, March 30, the old board of directors was re-elected. It comprises A. C. Whitaker, Alex Glass, G. W. Cook, W. W. Scott, George Spence, J. H. Lesh, F. J. Park. The board organized as follows: A. C. Whitaker, president; Alex Glass, vice-president; J. H. Lesh, vice-president and general manager; F. J. Park, secretary and treasurer.

Cincinnati

CINCINNATI, April 4.

Pig Iron.—While the market is not especially active, several fair sized sales are reported. A Muncie, Ind., melter bought 2000 tons of malleable from a Lake furnace at a reported price of \$18.50, furnace, and a Tennessee melter took 1000 tons of malleable on a \$19, Iron-ton, basis. Sales of Southern foundry iron at \$15 to \$15.50, Birmingham, in lots of 100 to 300 tons, were more frequent during the week, and some southern Ohio iron was also disposed of at \$19, furnace. A sale of 500 tons of silvery iron to a Michigan melter was made at the regular schedule. Inquiries include one for 1500 and one for 1200 tons from Michigan and one for 800 tons from Tennessee. The feature of the market is undoubtedly the advance of Southern irons, which are now quoted at \$16, Birmingham, \$1 up from last week. All Southern furnaces are now on this basis, and there is no disposition to quote beyond second quarter, although one furnace has booked an order for 300 tons for third quarter shipment. Practically all furnaces in the South are sold up for April shipment, and in one instance orders booked are sufficient to take care of output for three months.

Based on freight rates of \$4.50 from Birmingham and \$2.52 from Iron-ton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base).....	\$20.00
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)....	20.50
Ohio silvery, 8 per cent sil.....	30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)...	21.52
Basic Northern	21.02
Malleable	21.52

Finished Material.—Following the announcement of practically all of the independent mills of price advances on sheets effective April 1, good bookings were reported at the old prices in the Cincinnati district prior to Saturday. The orders, however, were mostly confined to one or two carloads, but the number placed served to bring the total up to a very large tonnage. While all independent mills have advanced prices on black, galvanized and automobile body sheets \$3 per ton, the advance was by no means general on blue annealed. Some mills have announced a new price of 2.40c., but others are still booking at 2.25c. An advance of \$2 a ton on wire rods is general, and presages an advance of a similar amount on wire nails, as a number of mills have been taking contracts on a 60 to 80-day delivery, which is taken to mean that an advance is contemplated. On the heavier products, the bookings are still rather light. The Big Four Railroad is inquiring for its second quarter requirements of bolts and nuts, billets, plates, sheets, nails, fence and axles, the largest item being for 900 tons of plates. The demand for wire products has been fairly good, and some nice tonnages of nails and woven wire fence are reported. There is little new work appearing in the structural field, although a number of structures involving tonnages of reinforcing bars are contemplated. Among these may be mentioned a 10-story automobile hotel at Cincinnati, to cost over a million dollars. An arcade with floors for manufacturing purposes is also contemplated. No award has been made as yet on the Snowden Building, Memphis, or the Business Men's Club, Cincinnati. The Riverside Bridge Co., Wheeling, W. Va., will fabricate 600 tons for the Y. M. C. A. building at Columbus, and the Russell Wheel & Foundry Co., 1200 tons for the Detroit Medical Building. The Insurance Exchange, Detroit, will likely be up for bids about May 1. This structure will take approximately 1200 tons, Merritt Harrison & Turnock, Indianapolis, being the architects.

Plant Operations.—Very little change will be noticed in plant operations, the American Rolling Mill Co. continuing to operate full at Middletown and Zanesville plants, with three sheet mills on at Ashland, Ky. The Andrews Steel Co. and the Newport Rolling Mill Co. will have the same schedule as last week. The Buckeye Steel Castings Co., Columbus, will light an additional furnace, giving employment to 200 more men, and the Bonney-Floyd Co. will have its basic furnace in full operation.

Warehouse Business.—Jobbers generally report better business, shapes and reinforcing bars being the

leaders. Wire products are moving considerably better, and cold-rolled steel during the week showed much improvement in both the number and size of orders. Prices are unchanged.

Iron and steel bars, 2.60c. base; hoops and bands, 3.20c. base; shapes and plates, 2.70c. base; reinforcing bars, 2.67 1/2c. base; cold rolled rounds, 3.35c. base; flats, squares and hexagons, 3.85c. base; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; common wire nails, \$2.75 per keg base; No. 9 annealed wire, \$2.60 per 100 lb.

Tool Steel.—The market is showing a little more life, and more sizable inquiries are reported than for many months. The buying is still for immediate delivery, however, but increasing manufacturing activities necessitates heavier purchases. Prices are unchanged, high speed steel with 18 per cent tungsten content being quoted at 75 to 80c. per lb.

Coke.—There is little activity in the coke market. Some ovens in the New River district have been closed on account of the coal strike, but Wise County and Pocahontas fields are not affected. Prices are unchanged from previous quotations.

Old Material.—There is only slight activity in the scrap market, blast furnace turnings being in fair demand, and some inquiries also being current for foundry grades. Prices are firmer, not on account of increased demand, but to more or less speculative buying by dealers.

We quote dealers' buying prices, f.o.b. cars:

Per Gross Ton	
Bundled sheets	\$5.00 to \$5.50
Iron rails	12.00 to 12.50
Relaying rails, 50 lb. and up.....	25.00 to 25.50
Re-rolling steel rails.....	10.50 to 11.00
Heavy melting steel.....	10.00 to 10.50
Steel rails for melting.....	10.00 to 10.50
Car wheels	12.50 to 13.00
Per Net Ton	
No. 1 railroad wrought.....	9.50 to 10.00
Cast borings	4.50 to 5.00
Steel turnings	3.50 to 4.00
Railroad cast	12.50 to 13.00
No. 1 machinery.....	14.50 to 15.00
Burnt scrap	8.00 to 8.50
Iron axles	16.50 to 17.00
Locomotive tires (smooth inside)....	9.50 to 10.00
Pipes and flues.....	4.00 to 4.50

Buffalo

BUFFALO, April 4.

Pig Iron.—The volume of small sales is greater and a slight stiffening in prices is apparent. The usual quotation on No. 2 plain is \$18.50 and deviation from this figure is remote. One seller is virtually out of the market for the next 60 days and another is entirely out of high silicon iron. An inquiry for 10,000 tons of foundry iron for third quarter delivery will not bring out a price from one Buffalo steel company furnace; its own needs and orders now on the books requiring all its production until the latter part of June. The Donner Steel Co. has one furnace blowing on foundry iron and the other on basic. Buffalo iron offered for sale in the Chicago district is a predicted development; a furnace having arranged for the shipment of 20,000 tons of iron by water to Chicago. The water rate between the two ports is much in favor of such an arrangement for Buffalo producers.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.....	\$18.50 to \$19.00
No. 2X foundry, 2.25 to 2.75 sil.....	18.50 to 19.00
No. 2 plain, 1.75 to 2.25 sil.....	18.00 to 18.50
Basic	18.00 to 18.25
Malleable	18.00 to 18.50
Lake Superior charcoal.....	26.14

Finished Iron and Steel.—Several selling factors have booked an extraordinary volume of business and the market is brisk in every line with the exception of plates. The better demand is felt in all offices; previous announcements of impending price advances having had the effect of closing a number of inquiries which were dragging along without action. The Seneca Iron & Steel Co. will, effective April 5, advance No. 28 black sheets to \$3.15 base, f. o. b., Pittsburgh with the usual differentials on other finishes. The basis of increased operation due to the increased volume of business has not been determined, but the 50 per cent. operation will be increased without delay. Quotations under 1.50c on bars and shapes have been withdrawn by several sellers. There is no change in the large

structural situation, but plans for some large enterprises are in the making and if only a small portion reach the award stage, the 1922 building season will be lively. The Buffalo Steel Car Co. will erect an addition to its plant and the Lackawanna Bridge Co. has taken the order for 200 tons of shapes. Scott Bros. of New York, are understood to be the low bidders on 750 tons of heavy girders for the Rochester subway and a like quantity of reinforcing bars. Most of the orders which developed last week called for immediate shipment and there is some disposition to cover needs for second quarter at 1.50c.

Warehouse Business.—Sheets and bars are in good demand and an improvement in most warehouse offerings is apparent. More small orders are being booked daily than in many months and the improved tone of the market is regarded as more stable than previous flurries.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.50c.; plates, 2.50c.; soft steel bars and shapes, 2.40c.; hoops, 3.15c.; bands, 3c.; blue annealed sheets, No. 10, 3.40c.; galvanized steel sheets, No. 28, 5.25c.; black sheets, No. 28, 4.25c.; cold-rolled strip steel, 5.65c.; cold-rolled round shafting, 3.20c.

Old Material.—Demand is now greater than the available supply in certain grades of old material and new prices are being quoted in consequence. About 6,000 tons of steel has been sold at \$14 and even a few small tonnages moved at \$15. The demand for low phosphorus and turnings and borings is keen. Further price advances are freely predicted.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel.....	\$14.00 to \$14.50
Low phos., 0.04 and under.....	17.50 to 18.50
No. 1 railroad wrought.....	15.00 to 16.00
Car wheels.....	16.50 to 17.50
Machine shop turnings.....	9.50 to 10.00
Cast iron borings.....	10.00 to 10.50
Heavy axle turnings.....	12.00 to 12.50
Grate bars.....	12.00 to 13.00
No. 1 busheling.....	12.00 to 12.50
Stove plate.....	14.00 to 15.00
Bundled sheet stampings.....	9.00 to 10.00
No. 1 machinery cast.....	17.00 to 17.50
Hydraulic compressed.....	12.00 to 12.50
Railroad malleable.....	13.00 to 14.00

Boston

BOSTON, April 4.

Pig Iron.—Contrasted with a month ago, small foundries in this territory are melting more per week, while some of the most important, especially those making textile machinery and heater castings, are doing less. The net result, therefore, shows little, if any, improvement and explains a further contraction in pig iron sales reported the past week. Buffalo iron is still the cheapest available in this market and constitutes the bulk of sales made since last reports. High silicon western and eastern Pennsylvania have sold in a small way, however, on a basis of \$20.50 furnace and \$21, respectively, for No. 1X. Buffalo No. 2X is \$18 furnace, while No. 1X is maintained at \$18.25 and higher, according to analysis, whereas a fortnight ago it sold for \$18. Alabama and Virginia irons are sentimentally firmer, but not quotably higher, due to inactivity. A Massachusetts foundry last week bought 500 tons of Buffalo No. 1X at \$18.25 furnace, representing the largest individual sale reported. Other sales range from 100 tons down to car lots. Two sales of malleable, one of 400 tons and the other of 150 tons, both at \$18 Buffalo furnace, are noted. No sales of charcoal iron are reported.

We quote delivered at common New England points as follows, having added to furnace prices \$4.06 freight from eastern Pennsylvania, \$5.46 from Buffalo, \$6.58 from Virginia and \$10.66 from Alabama:

East. Penn., sil. 2.25 to 2.75.....	\$23.06 to \$24.56
East. Penn., sil. 1.75 to 2.25.....	23.06 to 24.06
Buffalo, sil. 2.25 to 2.75.....	23.46 to 23.96
Buffalo, sil. 1.75 to 2.25.....	23.46 to 23.96
Virginia, sil. 2.25 to 2.75.....	29.58
Virginia, sil. 1.75 to 2.25.....	29.08
Alabama, sil. 2.25 to 2.75.....	26.16 to 26.66
Alabama, sil. 1.75 to 2.25.....	25.66 to 26.16

Warehouse Business.—The demand for structural steel continues the outstanding feature of the local warehouse business. Sheets also are selling well in anticipation of higher prices within the near future. Con-

sumption of iron and steel bars, bands, hoops, etc., is increasing, although slowly.

Jobbers quote: Soft steel bars, \$2.40½ per 100 lb. base; flats, \$3.05½; concrete bars, \$2.26 to \$2.68; structural steel, \$2.40½ to \$2.50½; tire steel, \$3.85 to \$4.25; open-hearth spring steel, \$4 to \$5.50; crucible spring steel, \$11.50; steel bands, \$2.90½ to \$3.53; hoop steel, \$3.31½; cold rolled steel, \$3 to \$3.50; refined iron, \$2.40½; best refined iron, \$1.25; Wayne iron, \$5.50; Norway iron, \$5.50; plates, \$2.65½ to \$2.83; No. 10 blue annealed sheets, \$3.48 per 100 lb. base; No. 28 black sheets, \$4.50; No. 28 galvanized sheets, \$5.50.

Coke.—Effective April 1, by-product foundry coke made in this territory is \$10.50 delivered on spot business and \$10.25 delivered on contract, where the local freight does not exceed \$3.40. These prices represent an advance of 10c. a ton on contract fuel and of 35c. on spot over the March schedule, and the first increase noted in many months. Producers booked more business in March than they did in any previous like period since 1920. Based on present consumption, most New England foundries have sufficient foundry coke on hand to last two months or longer. Further activity in the market, therefore, is expected to center largely in last half contracts.

Old Material.—Inactivity featured the market the past week. Anticipated buying of heavy melting steel and other materials did not develop, and New England foundries apparently are still able to supply their machinery cast requirements from local yards. No weakening in prices is noted. In fact, the undertone of the market, if anything, is firmer due to advices from other old material centers, but the lack of business has prevented any actual changes.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery.....	\$17.50 to \$18.00
No. 2 machinery.....	15.50 to 16.00
Stove plate.....	14.50 to 15.00
Railroad malleable.....	13.00 to 13.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$9.00 to \$9.50
No. 1 railroad wrought.....	10.50 to 11.00
No. 1 yard wrought.....	9.50 to 10.00
Wrought pipe (1 in. in diam., over 2 ft. long).....	7.25 to 7.75
Machine shop turnings.....	5.50 to 6.00
Cast iron borings, rolling mill.....	6.50 to 7.00
Cast iron borings, chemical.....	9.00 to 9.50
Blast furnace borings and turnings.....	5.50 to 6.00
Forged scrap and bundled skeleton.....	5.00 to 5.50
Street car axles.....	11.50 to 12.00
Shafting.....	12.00 to 13.00
Car wheels.....	11.00 to 11.50
Revolving rails.....	9.50 to 10.00

Cleveland

CLEVELAND, April 4.

Iron Ore.—The suspension by the Interstate Commerce Commission until July 30 of the proposed 20 per cent reduction in iron ore rates from Lake Erie ports to interior furnaces that was to become effective April 17, came as a surprise and a disappointment to the ore producers, who had seemed confident that the reduced rates would be allowed to go into effect. The suspension means a continuation of the uncertainty regarding rail rates on ore, possibly until the shipping season is half over. Because of this situation, sellers expect that the ore buying movement will be delayed, early season shipments will drag along and the tonnage moved during the first half of the season will be much lighter than it would be, were there no uncertainty about rail rates. Little ore goes on the docks during the early part of the season and the consumers will probably take very little for direct shipment outside of what they actually need as long as there is a possibility of having lower rail rates later. The result will evidently be the crowding into the latter half of the season the bulk of the ore shipments. The only ray of hope that shippers have for a more favorable outlook is that a decision may be rendered by the Interstate Commerce Commission on the rate case before July 30, so that either the suspension or the rate cut will be removed before that date or, if made permanent, at least the uncertainty regarding rate reductions will be removed. None of the ore firms is making plans for an early start in shipping ore. While some consuming interests will need ore as soon

as shipments can be made, it is expected that only a few cargoes will be shipped in April.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, \$6.45; Old range non-Bessemer, 51½ per cent iron, \$5.70; Mesabi Bessemer, 55 per cent iron, \$6.20; Mesabi non-Bessemer, 51½ per cent iron, \$5.55.

Pig Iron.—The market continues active in foundry grades with prices generally firm. Sellers booked a large number of orders during the week, but they were almost all for small lots, only one 1000 ton sale being reported. One producer made sales aggregating 8000 tons. Prices seem to be well maintained at \$19 for No. 2 foundry iron for shipment from lake or Valley furnaces and shading of this price to competitive points is not so much in evidence as a few weeks ago. For Cleveland delivery quotations range from \$19 to \$19.50 at furnace. There is an increased number of inquiries for third quarter contract but only one sale is reported for that delivery. That was a 300-ton lot, and the buyer paid 50c. a ton above the current market because of the extended delivery. Steel making iron is inactive. One seller is asking \$18.50 for basic iron. A few small lot sales of Southern iron are reported at \$15.50 and it is claimed that \$15 Southern iron has disappeared in this market. The increased activity at the automobile foundries has resulted in a better demand for Ohio silvery iron and some business has been taken on the basis of three tons at current market prices, to be shipped with one ton on old high priced contracts.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 56c. switching charge. Other quotations are delivered Cleveland, being based on a \$1.96 freight rate from Valley points, a \$3.36 rate from Jackson and a \$6.67 rate from Birmingham:

Basic	\$19.96
Northern No. 2 fdy. sil. 1.75 to 2.25.....	\$18.50 to 19.50
Southern fdy., sil. 1.75 to 2.25.....	21.67 to 22.17
Ohio silvery, sil. 8 per cent.....	30.86
Standard low phos., Valley furnace.....	30.00 to 31.00

Bolts, Nuts and Rivets.—Manufacturers report a good volume of orders for bolts and nuts from widely scattered sources and that the average size of orders has increased. The market has become firm. Most manufacturers have withdrawn the extra 5 per cent discount on stove bolts, which now are quoted at 80-10-10 and 10 per cent off list for packages. The demand for rivets has improved and the market is firmer. Some inquiries have come out for second quarter contracts.

Semi-Finished Steel.—The sheet bar market seems well established at \$31, and a local mill reports that it has taken considerable business for the second quarter delivery at that price, f.o.b. Youngstown. Recent sales include a 12,000 and a 4000-ton lot. The McKinney Steel Co. will start up its steel plant about April 15, placing four open-hearth furnaces in operation.

Ferroalloys.—Spiegeleisen has been active the past week, several sales aggregating 4000 to 5000 tons being reported in the Central Western territory.

Finished Material.—While prices lower than 1.50c. on round lots of steel bars, plates and structural material have not entirely disappeared, the market is now well established at that price. Following the closing of contracts for heavy tonnages on quotations outstanding when the price advance was made, the volume of business booked by independent mills declined during the week. Some small lot sales have been made at the new price, these including a 300-ton lot of steel bars. The Wilson Transit Co., Cleveland, has placed a contract for a 600-ft. freight boat with the Great Lakes Engineering Works, Detroit. This will require 4000 tons of plates and shapes, which will be furnished by the leading interest. A local shop has placed several hundred tons of plates for car repair work. A new inquiry has come from the Standard Oil Co. for stills requiring 1000 tons of plates. No structural lettings are reported and the only new inquiry in the building field is for 200 tons for the First National Bank, Massillon, Ohio. Considerable highway bridge work is coming out in various sections. Makers of hard steel reinforcing bars are making efforts to advance prices to 1.50c., but the 1.40c. price is still in evidence.

Jobbers quote steel bars, 2.21c.; plates and structural shapes, 2.46c.; No. 9 galvanized wire, 3c.; No. 9 annealed wire, 2.50c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.06c. to 3.10c.; hoops and bands, 2.56c.; cold-rolled rounds, 3.25c.; flats, squares and hexagons, 3.75c.

Sheets.—The \$3 per ton price advance made by

independent mills has brought out a large tonnage in sheets on quotations made at the old price. Following the advance on black and galvanized sheets, most independent mills have made a corresponding advance to 2.40c. on blue annealed sheets. Some jobbers covered with contracts are still taking orders for mill shipment at the old prices. While not many contracts have been closed for the second quarter, some mills are taking orders from their larger customers for contracts that will cover their requirements for about three months. A leading automobile manufacturer is inquiring for 4000 tons of sheets. Light plates in blue annealed gage have been marked up to 1.85c., or equivalent to 2.22c. for No. 10.

Strip Steel.—A heavy tonnage is being booked in cold-rolled strip steel at 3.50c., and one Valley mill is now quoting this at 3.65c. on new inquiries. Hot strip steel is firm at 1.90c.

Hoops and Bands.—Prices have stiffened and are firm at 1.90c. for hoops and 1.85c. for bands.

Pipe.—The city of Cleveland will take alternative bids April 12 for 60-in. riveted steel pipe or cast iron pipe for nine miles on water works extensions. This will require 22,500 tons of cast iron pipe or 13,000 tons of steel pipe. It is believed that cast iron pipe will be used.

Old Material.—The market has quieted down but prices are very firm and heavy melting steel and a few other grades have further advanced. During the week there was very little buying, by mills, purchases being limited to small lots. There was some trading between dealers, but this was rather limited as dealers appear to have become pretty well covered against recent sales.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel.....	\$13.75 to \$14.00
Steel rails under 3 ft.....	14.25 to 14.50
Steel rails, rerolling.....	16.50 to 17.00
Iron rails.....	14.00 to 15.00
Iron car axles.....	18.00 to 19.00
Low phosphorus melting.....	14.75 to 15.00
Cast borings.....	10.50 to 10.75
Machine shop turnings.....	10.50 to 10.75
Mixed borings and short turnings.....	10.50 to 10.75
Compressed steel.....	11.00 to 11.50
Railroad wrought.....	14.00 to 14.50
Railroad malleable.....	13.50 to 14.00
Light bundled sheet stampings.....	9.00 to 10.00
Steel axle turnings.....	11.50 to 11.75
No. 1 cast.....	15.50 to 16.50
No. 1 busheling.....	10.00 to 10.50
Drop forge flashings over 10 in.....	10.75 to 11.00
Drop forge flashings under 10 in.....	11.00 to 11.25
Railroad grate bars.....	13.25 to 13.50
Stove plate.....	13.50 to 13.75
Pipes and flues.....	11.00 to 11.50

Birmingham

BIRMINGHAM, ALA., April 4.

Pig Iron.—April found the Birmingham iron market firm at a minimum of \$15.50 by most makers and three on a base of \$16. The spot market is practically a \$16 one. Two smaller interests advanced to \$15.50 minimum a week before the end of the month and a few days thereafter to \$16. The largest producer held back until the middle of last week and then announced the company sold up for second quarter except for small lots for regular customers and opened for third quarter at \$15.50 for "limited tonnage." This maker was decidedly more conservative than others owing to larger active furnace capacity. The outstanding feature of the week was buying by sanitary pipe makers. High pressure pipe makers were also in the market. It is estimated that total bookings by all pipe makers for the week ending April 1 was 50,000 tons. It is known to have been at least 40,000 tons. Tennessee River iron of the Sloss-Sheffield Steel & Iron Co. will move at the rate of 2000 tons a week, owing to perfection of arrangements and better stage of river. Aggregate sales of two one-stack active operators are known to have totaled 70,000 to 75,000 tons since March 1. The one maker slow in getting into market is now filling up rapidly, while the Steel Corporation manifests no interest in the foundry market and has its seven active stacks on basic for company use. Consumers rushed to the market last week in a manner that almost made a high record. Sales were made in volume and rapidly. An offer of 2000 tons of 1.25 to 1.75 silicon on \$15 base was turned down flatly by two makers early in the week. There seems no

desire to rush greater production until market hardens at \$16, minimum, or over.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25.....	\$15.50 to \$16.00
Basic	14.50 to 15.00
Charcoal, warm blast.....	30.00

Cast-Iron Pipe.—High pressure pipe is firm at \$33, with a tendency to higher level. The National Cast Iron Pipe Co. has booked 1000 tons for Duluth. Sanitary pipe has advanced to \$40 from \$37 on heavy buying by jobbers with proviso of \$37 for prompt acceptances. Buying has been very general. Shipments of high pressure and sanitary pipe to the Pacific Coast this month approximate 8000 tons with 10,000 booked for April out of Mobile.

Coal and Coke.—April 1 found all Alabama mines at work, union and non-union. Absence of strike benefits appears to be the reason for union men continuing at work. Non-union miners in Alabama number about 25,000, compared with 2000 union. Coal production reached the highest point of the year last week. Alabama operators feel able to produce maximum if called on.

Finishing Mills.—The Tennessee company broke all its records at open-hearth plant, blooming and rail mills in March. The rail mill produced approximately 46,000 tons and open-hearth 96,000 tons. Ensley steel producing department, including rail and open hearths, remains at capacity. The Conners Steel Co. is operating steel band and hoop mill on continuous schedule for first time in many months. American Sheet & Wire Co. and Gulf States Steel Co. are reported at 60 to 70 per cent.

Old Material.—Cast scrap is strong and seems due for a rise if the higher iron market continues that way. Steel is affected by limited number of district consumers and high freight rates.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	\$12.00 to \$13.00
No. 1 steel.....	11.00 to 12.00
No. 1 cast.....	14.00 to 15.00
Car wheels	13.00 to 14.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought.....	11.00 to 12.00
Stove plate	13.00 to 14.00
Cast iron borings.....	6.00 to 7.00
Machine shop turnings.....	4.00 to 5.00

San Francisco

SAN FRANCISCO, March 30.

Pig Iron.—The placing of 500 tons of 1.75 to 2.25, and 150 tons of 2.25 to 2.75 silicon domestic pig iron by the Southern Pacific Railroad Co. at a very low figure is easily the most conspicuous business of the past three weeks. In fact, it is practically the only single transaction worthy of record. Trading has been unexpectedly light, and what demand there is seems to be confined to small lots. Interest in foreign iron is very slight at present, due in part to the higher quotations and water freights, and correspondingly attractive prices at Gulf points. An occasional shipment of domestic iron is reported, but buyers are taking cautiously. The steamer Montana arrived a few days ago with about 2000 tons of material already sold.

Finished Iron and Steel.—There appears to be a gradual revival in the steel trade on the Coast, although it cannot be claimed that current business is on a large scale. One of the most promising features of the market is the steady expansion of building operations. From nearly all points along the Coast come reports of improvement in this line. Of course, the moderate size type of structure preponderates, but there are likewise many of larger proportions, one of the latest of which is an eight-story business building to be erected in San Francisco, which will require about 650 tons of steel. The market for plates, shapes and sheets seems to be steadily gradually, possibly under the influence of the Eastern situation. There is a fair demand for sheets, but plates and shapes are quiet. Black sheets are said to be around 3c., blue annealed about 2½c. and galvanized around 4c. tidewater.

Cast Iron Pipe.—A fair activity continues in the Coast market, with the main interest centering around

Seattle, where a large pipe line job and paving construction work are attracting the attention of fabricators in the West. Private work holds up pretty well, but municipal prospects are not conspicuous.

Coke.—The Southern Pacific last week bought 600 tons of domestic coke. As in the case of pig iron, the company's business constitutes the main activity of the market at present. There is a fairly steady demand, but since consumers generally are well stocked, and are not operating more extensively than before, the actual trading is for small current requirements. The market on domestic beehive is about \$7.50, f.o.b. ovens, and lower on the poorer grades.

Old Material.—This continues virtually a routine market, with business limited to a narrow volume of trading. Consumers have liberal stocks on hand. Very little betterment in foundry operations is observed. Heavy melting steel seems to have settled at about \$9.50 a gross ton delivered at consumers' mills, while cast iron scrap is quiet at from \$21 to around \$23.

St. Louis

ST. LOUIS, April 4.

Pig Iron.—This has been the best week of the year in volume of sales of pig iron. The business of melters in the district is increasing, with the result that they are decidedly more interested in the purchase of pig iron. The market for Northern iron is firm at \$20, Chicago. As for Southern iron, two independent makers advanced their price to \$16, although other makers are quoting as low as \$15. One of the two concerns first referred to is sold up for April. The biggest sale made here was to the Commonwealth Steel Co., 5,000 tons of basic by the Granite City maker, who had sold the same concern 5,000 tons of basic the previous week. A west side melter bought 2000 tons of basic from the same maker, who also sold 700 to 1,000 tons of miscellaneous foundry grades. A representative of a Chicago producer sold 3,500 tons. Sales of a Sheffield maker for barge and rail shipment for the week were 1,300 tons, three lots being for 300 tons each, the remainder for from 40 to 150 tons. This was the best week the concern had had here since it established the combination haul. Another Southern maker sold 1,000 tons to a St. Louis stove manufacturer. Sales of smaller lots were of improved volume. Pending inquiries include: 1000 to 2000 tons of malleable for a western Indiana melter; several thousand tons of foundry iron for a Wisconsin melter; 500 to 1,000 tons for a northern Indiana melter, while other inquiries from this district in from 100 to 500 ton lots amount to about three or four thousand tons.

We quote delivered consumers' yards, St. Louis as follows, having added to furnace prices \$2.80 freight from Chicago and \$5.74 from Birmingham:

Northern foundry, sil. 1.75 to 2.25...	\$22.80
Northern malleable, sil. 1.75 to 2.25...	22.80
Basic	22.80
Southern foundry, all rail, sil. 1.75 to 2.25	\$20.74 to 21.24
Southern foundry, water and rail, sil. 1.75 to 2.25, f.o.b. St. Louis.....	19.11

Coke.—Right at the turn of the coal strike there does not seem to be a great deal of interest in the coke market. Most consumers are provided with fairly liberal stocks of coke, and for the present are not concerned one way or the other. Coke is moving in good quantities, with the exception of domestic grades, which are moving rather slowly. The Granite City producers report the sale of 2,000 tons of furnace coke for April and May shipment. This producer is now picking up reclaimed coke from accumulated stocks.

Finished Iron and Steel.—Renewed interest is being shown in sheets as a result of the announcement that the largest independent producer has sold up until July 1 and had withdrawn from the market, which action was also taken by another maker. Structural steel is showing some activity, but this will be limited until an adjustment of the wage question has been made with all unions. Inquiries from railroads have not been as heavy as in the last few weeks. The United Railways Co. will build in its own shops the 50 steel cars that the Federal Court has authorized the receiver to purchase, and inquiries for the material have been sent out. The Texas & Pacific Railway is in the market

for 50,000 tie plates for 75 and 85 lb. rails. Purchases of track spikes by the Terminal Railway Association, St. Louis Southwestern and Missouri Pacific Railroads totaled 300 to 400 tons. The Terminal Railway Association is in the market for 75 frogs.

For stock out of warehouse we quote: Soft steel bars, 2.37½c. per lb.; iron bars, 2.37½c.; structural shapes, 2.47½c.; tank plates, 2.47½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.15c.; cold drawn rounds, shafting and screw stock, 3.50c.; structural rivets, \$3.09½ per 100 lb.; boiler rivets, \$3.19½; tank rivets, 7/16-in. and smaller, 65 and 5 per cent off list; machine bolts, large, 60-10 per cent; small, 60, 10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws, 65-5 per cent; hot pressed nuts, square or hexagon blank, \$4; and tapped, \$3.75 off list.

Old Material.—The old material market continues very strong and active, and as several additional consumers have entered the market, prices on most steel grades have again been advanced. A few of the consumers are holding back, believing that a reduction will set in, but dealers have been encouraged by the reports of improvement in the finished steel business and are trading heavily between themselves on the assumption that the advances are permanent. Relaying rails are much stronger and very active and have been marked up \$2 a ton. Railroad lists before the market this week follow: Pennsylvania lines (Northwestern region) 3,500 tons; Pennsylvania lines (Southwestern region) 5,000 tons, of which 1,380 tons are cast iron car wheels; Chicago, Indianapolis & Louisville, 950 tons; Baltimore & Ohio, 13,500 tons, and Chicago, Burlington & Quincy, 4,850 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Old iron rails.....	\$16.00 to \$16.50
Steel rails, rerolling.....	13.00 to 13.50
Steel rails, less than 3 ft.....	12.50 to 13.00
Relaying rails, standard section.....	23.00 to 28.00
Cast iron car wheels.....	15.50 to 16.00
No. 1 railroad heavy melting steel.....	11.50 to 12.00
No. 1 heavy shoveling steel.....	11.00 to 11.50
Ordinary shoveling steel.....	11.00 to 11.50
Frogs, switches and guards, cut apart.....	11.50 to 12.00
Ordinary bundle sheets.....	5.00 to 5.50
Cast steel bolsters.....	12.00 to 12.50
Per Net Ton	
Heavy axle and tire turnings.....	7.00 to 7.50
Iron angle bars.....	15.00 to 15.50
Steel angle bars.....	11.50 to 12.00
Iron car axles.....	20.00 to 20.50
Steel car axles.....	14.50 to 15.00
Wrought iron arch bars and transoms.....	16.00 to 16.50
No. 1 railroad wrought.....	11.00 to 11.50
No. 2 railroad wrought.....	10.50 to 11.00
Railroad springs.....	12.50 to 13.00
Steel couplers and knuckles.....	12.50 to 13.00
Locomotive tires, 42 in. and over, smooth inside.....	11.00 to 11.50
No. 1 dealers' forge.....	9.50 to 10.00
Cast iron borings.....	6.50 to 7.00
No. 1 busheling.....	10.00 to 10.50
No. 1 boilers cut in sheets and rings.....	7.00 to 7.50
No. 1 railroad cast.....	14.00 to 14.50
Stove plate and light cast.....	13.00 to 13.50
Railroad malleable.....	12.00 to 12.50
Agricultural malleable.....	12.00 to 12.50
Pipes and flues.....	8.00 to 8.50
Heavy railroad sheet and tank.....	7.00 to 7.50
Light railroad sheet.....	4.50 to 5.00
Railroad grate bars.....	11.50 to 12.00
Machine shop turnings.....	4.00 to 4.50
Country mixed iron.....	8.00 to 8.50
Uncut railroad mixed.....	9.50 to 10.00
Horseshoes.....	9.50 to 10.00
Railroad brake shoes.....	11.00 to 11.50

Vehicular Tunnel Contract

At present the only contracts awarded for material involved in the construction of the Hudson River vehicular tunnel, by Booth & Flinn, Ltd., 17 Battery Place, New York, are those mentioned in THE IRON AGE, March 31. The bolts and nuts called for in the contract have been about equally divided between the Pittsburgh Screw & Bolt Co. and the Bethlehem Steel Co., which will also fabricate all structural steel, built-up floor beams, etc. No contracts for the wrought iron, steel and cast iron pipe required have as yet been let.

Some steel pipe, however, will be used by Booth & Flinn for transmission of compressed air in the two temporary plants, which are being erected, one at Canal and West streets, New York, the other at Provost and Twelfth streets, Jersey City, N. J. These plants, each of approximately 10,000 sq. ft., involve the expenditure of about \$200,000 and will be equipped with compressed air systems, small lathes, pipe cutters and benders.

WORKING ON TARIFF BILL

Senate Committee Hopes to Report Latter Part of This Week

WASHINGTON, April 4.—Finishing touches are being given to the permanent tariff bill by the Senate Committee on Finance. It now expects to report the measure the latter part of the present week. Like previous dates named for this action, the present one carries no assurance, but it is known that the committee is anxious to get the bill into the Senate at as early a time as possible and members therefore are hoping this can be done within a few days.

Some of the details being gone over relate to the steel schedule. During the past week the committee worked on such items as tungsten ore, ferrotungsten and tool steel and has named duties on these products and it is said that they probably will not be changed again before the bill is reported. On tungsten the Senate bill, like the House measure, carries a duty of 45c. per lb. on the metallic tungsten content, or \$7.14 per unit of 20 lb. In this, as in other items where ad valorem duties also are provided, the Senate committee has increased the ad valorem approximately 50 per cent over the ad valorem rates in the House bill. This is due to the fact that it is now proposed to report the bill to the Senate on a foreign valuation basis, although this, it is said, has not been definitely determined. The house bill provides the same specific duty on ferrotungsten as on high speed steel, but did not provide a differential for loss and conversion from the ore into ferrotungsten and from ferrotungsten into high speed steel, while the Senate bill takes these items into account. The Fordney bill specific rate was 72c. per lb. for both ferrotungsten and high speed steel. The Senate bill specific rates are 60c. per lb. on ferrotungsten and 72c. per lb. on high speed steel. The Fordney bill also provided for a specific duty only on tungsten in excess of 1½ per cent, while the Senate bill has provided for all tungsten in excess of 6/10 per cent. The rate on ferromolybdenum and metallic molybdenum in paragraph 302 of the Fordney bill is fixed at \$1.25 per lb. on the molybdenum content and 17 per cent ad valorem, and has been changed to \$1, with an ad valorem rate, in the Senate bill, while the additional cumulative duty of \$1.25 on molybdenum content carried on products named in paragraph 305 of the Fordney bill has been left at \$1.25 on the molybdenum content in excess of 1 per cent.

The committee is still undecided as to disposition of manganese ore and ferromanganese, but it is reported to be seriously considering a duty of \$2 per ton on the former and \$5 per ton on the latter. It is said to have definitely determined upon a duty of 4/10c. per lb. on grain magnesite and 5/16c. per lb. on crude magnesite.

Complications have increased, if anything, regarding the basis of valuation in the tariff bill. Chairman Fordney of the House Committee on Ways and Means is standing solidly for American valuation and has served notice that before he will accept foreign valuation as a basis he will have the bill repassed in the House on the American valuation basis and sent back to the Senate. Whether he could actually make good this threat remains to be seen. It is plain that such a development would probably mean failure of tariff legislation at the present session of Congress. Reports have it that the Senate Committee may work out a compromise of some sort, such as providing for assessing duties on the American wholesale selling price, which, it is said, would be accepted by Mr. Fordney as a form of American valuation.

Ore Rate Hearing Ended

The taking of evidence in the case of the Adriatic Mining Co., et al. vs. the Chicago & North Western R. R., et al., which involved an application for a reduction of rates on iron ore to Upper Lake docks, was concluded in Chicago on March 28. The case has been before the Interstate Commerce Commission several months with hearings at various times in Chicago before Examiner Howard Hosmer.

EXPORT OUTLOOK PROMISING

Japanese Still Buying and at Higher Prices — Railroad Electrification Progress— China Quiet

NEW YORK, April 4.—While the Japanese market continues active on a fairly wide range of materials, South American markets are beginning to show increased evidence of a revived interest in American iron and steel. There will undoubtedly be some buying of railroad materials and construction machinery for South American projects during the next few months. From a railroad standpoint, Japanese buyers are showing an active interest, as the plans of the Government for electrification of the Imperial railroads approach consummation. The Chinese market is quiet, but recent difficulties encountered by buyers in obtaining delivery on orders placed in Germany and Belgium have brought American sellers into a more favorable light.

Buying May Be Curtailed

Iron and steel purchases by Japan continue active despite the stiffening in prices for export. The new \$10 freight rate on cargoes to Japanese ports, although in force for some time, is said to have affected shipments only in a few instances, as a large number of tonnages have been shipped on old contracts made at the \$8 rate. With the new rate in actual operation, some exporters express apprehension that the additional burden, in view of the stiffening prices for material, will place American sellers at a disadvantage.

There is evidently a growing realization among Japanese purchasers that the United States market is rising and there has been some buying at the increased prices. One export house recently quoted \$42.50 per ton, c.i.f. Japanese port, on a fair tonnage of mild steel bars. The quotation was turned down because of price, but a week later the order was placed at \$44 per ton, c.i.f. Japan. The converse was true, however, of the contemplated purchase of about 6000 tons of 60-lb. rails by the Imperial Government Railways. The price of \$45 per ton, c.i.f. Japan, is reported to have exceeded the amount appropriated by the railroads for this purpose and purchase was indefinitely postponed.

Bids were opened March 31 in Japan by the Government on about 2500 tons of bridge material. One of the large Japanese export houses, which recently booked an order for 2000 tons of blue annealed sheets of various gages, has a second inquiry in hand for 2000 tons of these sheets from the same source. This company also reports a number of small bar orders, the largest of which were for 800 tons, 400 tons and 274 tons. As in the domestic market, March has shown a distinct improvement, particularly with those companies dealing with the Far East. Among numerous recent purchases announced was 300 tons of telegraph wire and about 50 tons of electric sheets.

Japanese Electrification Plans Progressing

At present the railroad electrification project in Japan is still in the experimental stages. Much attention is being devoted by the Government to standardization and experimentation with various types of equipment, particularly electric locomotives of different manufactures and the merits of various power installations. The Westinghouse International Co., through Takata & Co. has recently booked orders for several small units as well as a small number of electric car sets, the Onsen Denki Railway and the Sapporo Electric Railway Co., being among the purchasers. The motors, trucks, airbrakes and wheels were divided among Westinghouse International Co., Ramapo Foundry & Wheel Works and J. G. Brill Co. A recent order for 13 car equipments, placed by the Osaka Tetsudo K. K. included 52 motors as well as trucks, wheels and axles. At present the Government has under order six electric locomotives, 61-tons, which will be used for experimental purposes, to determine the most satisfactory type for general use on all lines when electrified. These six include two Westinghouse, two General Elec-

tric and two Dick-Kerr (British manufacture). Probably the first of these will be delivered by Westinghouse International Co. in June. The Chichibu Electric Railway, a privately owned interest, is now assembling in its shops five 42 ton electric locomotives for use on lines of 600 to 1200 volts. This activity by privately owned railroads is said to be somewhat speculative in nature, the railroads endeavoring to standardize their equipment in line with the government standards so that they may be sold to the Government at a higher price when all lines are electrified and consolidated.

Chinese Market Quiet

The Chinese market is quiet at present, although there are prospects of a general improvement in the demand for iron and steel products. The Shanghai market for steel has been quiet, except for tin plate and wire nails. The weakening in British quotations c.i.f. Shanghai, deterred buying temporarily. Recent difficulties experienced by buyers of German and Belgian steel in obtaining delivery at dates promised, has placed American quotations in a more favorable light. Action on the recent tenders by the Peking Tramways for rails and power equipment, on which bids were opened March 20, is believed to have been delayed temporarily because of the difficulties of the Banque Industrielle de Chine, which holds a controlling interest. Funds for the extension of the Peking-Mukden Railroad from Chinwangtao to Tongshan are said to have been provided.

Australian Steel Plant Closes

The Newcastle Steel Works of the Broken Hill Proprietary Co. in Australia, which has recently been operating on a restricted schedule, it is announced, will completely suspend operations the middle of this month, being unable to compete with England and other countries on price.

Large Blast Furnace Outputs

An accurate and highly esteemed reader of THE IRON AGE calls attention to the fact that the Pittsburgh Steel Co.'s record of 825 gross tons of pig iron in 24 hr., as printed in THE IRON AGE, March 9, 1922, page 663, while good, is still far behind the record of the Edgar Thomson Furnace E of Carnegie Steel Co., which in June, 1902, made 901 tons of pig iron in a single day.

Unusually large productions were made by two furnaces in March. The Weirton furnace of the Weirton Steel Co., Weirton, W. Va., produced 23,008 tons and the Trumbull-Cliffs furnace at Warren, Ohio, had an output of 19,064 tons.

Locomotive Orders

The American Locomotive Co. has received orders for 17 locomotives during the past week. Of the total number 3 were six-wheel switching, 2 were four-wheel switching, 6 consolidated type and 6 Mikado type. One of the six-wheel switching locomotives was ordered by the Carnegie Steel Co. The 6 Mikado type locomotives are for the Louisville & Nashville Railroad.

Large Open-Hearth Steel Output

The Weirton Steel Co., Weirton, W. Va., produced 49,118 tons of ingots in its open-hearth plant, seven furnaces being in operation. No. 1 made 7299 tons; No. 2, 6389 tons; No. 3, 7031 tons; No. 4, 7857 tons; No. 5, which was out 10 days, 5015 tons; No. 6, 7674 tons, and No. 7, 7853 tons.

New Prices on Flanging and Dishing

The reductions put into effect by some of the steel companies which specialize on flanging and dishing of heads, referred to in THE IRON AGE of March 30, leave list prices as heretofore. The change consists in the offering of larger discounts on quantity orders.

British Iron and Steel Market

Home Demand Slack—Coke and Tin Plate Dearer
—Labor Dispute Raging—Continental

Quotations

(By Cable)

LONDON, ENGLAND, April 4.

Labor disputes in the engineering trades are still unsettled.

Pig iron is quieter. Consumers are waiting industrial developments. Midland and Scottish pig iron is competing with Cleveland. One more Cleveland furnace has been blown out.

Export demand for hematite has declined. Home consumers are also quiet.

America is buying South Spanish ore. Bilbao Rubio is quiet, being nominally 26½s. to 27s. (\$5.83 to \$5.94) ex-ship Tees.

Finished steel is quiet generally, for both home and export. South Africa is inquiring for substantial tonnages, but conditions here are hampering business. Prices are firm.

Continental material is slow and little business is moving. French foundry pig iron and Continental basic pig iron are not being offered. There are no quotations being made on Continental billets.

Tin plate is firm with increasing business in option contracts. April and May delivery has been done at 19¼s. (\$4.23) basis, f.o.b. Prompt sellers are asking up to 19¾s. (\$4.35) basis, f.o.b. Extras, tin lining hooping, are now on 1s. basis. Japan is purchasing good quantities of quarter wasters. For light 20 x 14s. Portugal has paid 37s. to 38s. (\$8.14 to \$8.36) f.o.b. South America has bought fair lines of 28 x 20s. The home trade is buying good parcels of odd sizes. Options are being done at 19¼s. (\$4.23) f.o.b. for April. Tin plate bars are being talked of as going higher.

There is small buying of odd parcels of galvanized sheets, but no sign of revival from the main overseas

purchasers. Prices are firm. Far Eastern specifications of black sheets are in continued demand. Most works are booked up to June. Sellers ask £15 15s. (3.09c. per lb.) f.o.b.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at \$4.40 per £1, as follows:

Durham coke, delivered	1 8½		6.27	
Cleveland No. 1 foundry	4 15		30.90	
Cleveland No. 3 foundry	4 10		19.80	
Cleveland No. 4 foundry	4 7½		19.25	
Cleveland No. 4 forge	4 10		19.80	
Cleveland basic	4 10		19.80	
Hematite	7 0*		30.80*	
East Coast mixed	5 0	to 5 2½	22.00 to	22.55
East Coast hematite	4 17½	to 5 0	21.45 to	22.00
Ferromanganese	15 0	& 14 10*	66.00 &	63.80*
Rails, 60 lb. and up	8 0	to 9 10	35.20 to	41.80
Billets	7 0	to 8 0	30.80 to	35.20
Sheet and tin plate bars,				
Welsh	7 0	to 7 7½	30.80 to	32.45
Tin plates, base box	0 19½	to 0 19¾	4.18 to	4.35
			C. per Lb.	
Ship plates	9 5	to 10 10	1.80 to	2.04
Boiler plates	12 10	to 14 0	2.43 to	2.72
Tees	9 10	to 11 0	1.85 to	2.14
Channels	8 15	to 10 5	1.70 to	1.99
Beams	8 10	to 10 0	1.65 to	1.94
Round bars, ½ to 3 in.	10 10		2.04	
Galvanized sheets, 24 g.	16 0	to 16 5	3.13 to	3.16
Black sheets	12 10	to 12 15	2.43 to	2.48
Steel hoops	12 0	& 12 5*	2.33 &	2.38*
Cold rolled steel strip,				
20 g.	23 10		4.56	

*Export price.

Continental Prices, All F.O.B., Delivery as Specified

No. 3 Foundry pig iron:				
Belgium, May	£4 17½s.	to £5 0s.	\$21.45 to	\$22.00
Luxemburg, May	4 17½	to 5 0	21.45 to	22.00
Wire rods:				
France, June	8 10		27.40	
Sheet bars:				
Belgium, May	6 15	to 7 0	29.70 to	30.80*
Merchant bars:			C. per Lb.	
Belgium, May, June	8 0	to 8 10	1.57 to	1.67
Luxemb'g, May, June	8 0	to 8 7½	1.57 to	1.64
Germany, June	8 0	to 8 10	1.57 to	1.67
France, May, June	8 15		1.72	
Joists (beams):				
France, April, May	7 15		1.52	
Luxemb'g, April, May	7 15		1.52	
Belgium, April, May	7 5		1.42	
½-in. plates:				
Belgium, May, June	8 7½	to 8 10	1.64 to	1.67
Channels:				
Belgium, April, May	7 10	to 8 0	1.47 to	1.57

Effect of Engineers' Strike—Little Relief to the Depression—Conditions in Shipbuilding

LONDON, England, March 15.—General conditions have changed but little. The threatened stoppage of shipbuilders and engineers has so far had little effect upon steel makers, as it would merely mean that they would shut down altogether, and in many instances lose less money by doing so than by selling at to-day's values. Conferences, however, are being held and it is hoped that the question will be settled amicably.

In the pig iron market the threatened industrial disturbance caused some uneasiness among home consumers and business showed signs of diminishing, but more confidence seems to have appeared and the home trade has been buying fair quantities during the last few days. In the export markets, too, there has been an increase in the sales, particularly to continental consumers. No more furnaces have yet been put into blast, as makers are uncertain as to the future costs of raw material. Prices of pig iron are well held, 90s being asked for No. 3 foundry quality of Cleveland make for either home or export consumption. In the hematite trade prices have advanced somewhat, and makers are asking for East Coast mixed numbers about 100s for either home or foreign use. There is not much moving in the home trade, South Wales being the most active buyer, but sales for export are moderate, Italy and Germany showing a fair amount of interest.

The depression in finished iron and steel shows little signs of relief, especially in view of the threatened strike of engineers and shipbuilders. Our prices still seem too high for export buyers to take any substantial quantities, while in the home trade consumers are only purchasing from hand to mouth. In one or

two instances, such as shapes, export quotations have gone up about 5s, the sellers at low prices having booked enough orders and withdrawn from the market.

In its annual report for 1921-22 the Chamber of Shipping of the United Kingdom states that the depression in that industry, which began in 1920, was accentuated in the following year. Compared with the maximum reached in 1920, freight rates dropped 74½ per cent, but wholesale prices declined only 44½ per cent, while retail prices went down as little as 28½ per cent. At the beginning of January of last year 2,250,000 tons of British shipping were idle either at home or abroad, resulting in about 30,000 officers and men of the Mercantile Marine being out of employment. At the end of the year the depression in the shipping industry had reached a point at which it was confidently asserted that it could go no further in view of the failure of the revenue and expenditure to balance. Such cargo vessels as remained at sea could only run by reason of capital reserves, while passenger and mail boats showed no profits. Many new shipping companies, inaugurated during or immediately after the war, were forced into liquidation. The report closes by saying that improvement in the shipping situation must wait for the recovery of trade and commerce both in this country and throughout the whole world.

On the occasion of his retirement April 1, after 17 years of service, as credit manager and assistant treasurer of the Truscon Steel Co., O. W. Chaffee was presented a gold watch and chain with a Rotary club emblem, by associates. Mr. Chaffee resigned to become financial manager for Parish Bros., a large contracting interest at Youngstown, Ohio.

NON-FERROUS METALS

The Week's Prices

	Cents Per Pound for Early Delivery							
	Copper, New York		Straits		Lead		Zinc	
	Lake	Electro-lytic*	Tin New	New York	St. Louis	New York	St. Louis	
March	12.75	12.50	29.00	4.70	4.55	5.00	4.65	
29.....	12.75	12.50	28.87½	4.80	4.60	5.02½	4.67½	
30.....	12.75	12.50	28.87½	4.80	4.60	5.02½	4.67½	
31.....	12.62½	12.37½	29.00	4.80	4.60	5.02½	4.67½	
April								
1.....	12.62½	12.37½	29.00	4.80	4.60	5.02½	4.67½	
3.....	12.62½	12.37½	29.37½	4.90	4.65	5.05	4.70	
4.....	12.75	12.50	29.50	4.90	4.65	5.10	4.75	

*Refinery quotation.

New York

NEW YORK, April 4.

All the markets are fairly active and stronger with the exception of copper. Sales of copper have been heavy but prices are lower. The tin market has been moderately active but firm. The lead market has advanced quite sharply. Demand for zinc has improved and prices have advanced.

Copper.—Despite the fact that sales of electrolytic copper during March, variously estimated at 140,000,000 to 150,000,000 lb., were the heaviest in several months, prices have fallen. Inquiries in the market were also large. There are various explanations for this unusual situation in view of the fact that other metals are advancing. Active competition for both foreign and domestic orders seems to be the logical explanation. While electrolytic copper could be bought late last week as low as 12.62½c., delivered, the market to-day is a little firmer at 12.75c., delivered, or 12.50c., refinery, for April and through the second quarter, depending upon the seller. There are, however, still some sellers who will not meet these prices. With other metals advancing it is generally expected that copper has turned the corner.

Copper Averages.—The average price of Lake copper for the month of March, based on daily quotations in THE IRON AGE, was 12.93c., New York. The average price of electrolytic copper was 12.68c., refinery, or 12.93c., delivered.

Tin.—Since the marked activity noted in this survey of the market a week ago, buying has been only moderate, but sales have been enough to establish prices. Practically every day since March 28 the market has been quiet except on March 29 when a fair business was done. There were also some sales made on Saturday, April 1. Thus far this week the market has been quiet. Consumers have been the principal buyers in the business which has been done and the quotation for spot Straits has hovered around 29c., New York, with 29.50c. quoted to-day. Deliveries into consumption in March were 6030 tons, with 2260 tons landing and 826 tons in stock on March 31. Imports for the first quarter were 14,910 tons as compared with only 5443 tons in the corresponding quarter last year. The quantity of tin afloat is reported as 4775 tons. The London market to-day is firm with spot standard quoted at £143 12s. 6d., future standard at £145 2s. 6d. and spot Straits at £146 2s. 6d. per ton, or about £1 higher than a week ago. Although the visible supply of tin is large and would be considered unwieldy under normal conditions, it is being gradually cut down and the situation is regarded as satisfactory.

Lead.—After maintaining its price at 4.70c., New York, since last September the leading interest in the last week advanced its quotation first to 4.80c., and then to 4.90c., New York, with the St. Louis price at 4.60c. The outside market, which practically led the advance, is also higher at 4.90c., New York, and 4.65c. to 4.70c., St. Louis. The higher prices are not a surprise and are a reflection of the strength of the market, which has been manifest for some time.

Zinc.—Consumers of prime Western zinc are more active in inquiries as well as in buying and prices have advanced. For early or April delivery the market is

firm at 4.75c., St. Louis, or 5.10c., New York, at which levels sales have been made; for May and June delivery quotations are 4.80c. and 4.85c., St. Louis, respectively. Moderate sales for advanced positions are reported.

Antimony.—The market continues to advance and wholesale lots for early delivery are quoted at 4.50c., New York, duty paid.

Aluminum.—The market is unchanged and wholesale lots of virgin metal, 98 to 99 per cent pure, for early delivery are quoted by the leading producer at 19c. to 19.10c., f.o.b. plant, depending on the quantity, with importers offering the same grade at 17.50c. to 18.50c., New York, duty paid.

Old Metals.—Business is very quiet and transactions are only put through at concessions. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible.....	12.25
Copper, heavy and wire.....	11.25
Copper, light and bottoms.....	9.25
Heavy machine composition.....	9.50
Brass, heavy.....	7.00
Brass, light.....	5.75
No. 1 red brass or composition turnings.....	8.00
No. 1 yellow rod brass turnings.....	6.25
Lead, heavy.....	4.25
Lead, tea.....	3.25
Zinc.....	3.00

Chicago

APRIL 4.—Lead has gone up principally because of two successive advances by the leading producer. Copper is weak, and all of the metals are quiet so far as new business is concerned, buying of tin alone being in fair volume. A number of advances in old metals are recorded. We quote in carload lots: Lake copper, 13c. to 13.25c.; tin, 30.50 to 31c.; lead, 4.75c.; spelter, 4.75c.; antimony, 6c., in less than carload lots. On old metals we quote: Copper wire, crucible shapes and copper clips, 9.75c.; copper bottoms, 7.75c.; red brass, 7.25c.; yellow brass, 6c.; lead pipe, 3.50c.; zinc, 2.25c.; pewter, No. 1, 22c.; tin foil, 23c.; block tin, 25c.; all buying prices for less than carload lots.

St. Louis

APRIL 4.—The increase in the price of lead concentrates from \$32 a ton last summer to \$65 a ton, and zinc concentrates from \$22 a ton last summer to \$27 a ton, has caused improved conditions in the Missouri-Oklahoma-Kansas field, and more than twice the number of mines are in operation now than on Jan. 1, nearly 80 mills working out of 225 in the district. Shipments of lead concentrates are about 100 per cent above the 1921 average, and the zinc increase is 50 per cent. Lead was strong here this week, owing to the advance made by the American Smelting & Refining Co., while zinc was steady. We quote in carload lots: Lead, 4.50c.; slab zinc, 4.60c. to 4.70c. On old metals we quote: Light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; pewter, 15c.; tin foil, 16c.; tea lead, 2c.; aluminum, 9c.

Shipping Steel by River

PITTSBURGH, April 4.—The Jones & Laughlin Steel Co. yesterday started a tow of eight barges of steel products to points along the Ohio and Mississippi rivers. This is the largest shipment made by the company since it inaugurated this service last fall, and is the first one in which it has used one of its own steamers for pushing the barges down the rivers. The steamer Aliquippa, which is being used, is one of the fleet of the Vesta Coal Co., a Jones & Laughlin subsidiary. Hereafter the company will make shipments every month by the river route to the South.

Cost Reporting Case Advanced

WASHINGTON, April 4.—The Court of Appeals has granted the motion of the Federal Trade Commission to advance the Claire Furnace Co. cost reporting case on appeal by the commission and set the case specially for hearing on May 1. The motion relates to the assignment of errors filed recently by the commission.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic...	\$0.36	Kansas City	\$0.815
Philadelphia, export...	0.265	Kansas City (pipe)...	0.77
Baltimore, domestic...	0.35	St. Paul	0.665
Baltimore, export	0.255	Omaha	0.815
New York, domestic...	0.35	Omaha (pipe)	0.77
New York, export	0.285	Denver	1.35
Boston, domestic	0.405	Denver (wire products)...	1.415
Boston, export	0.285	Pacific Coast	1.665
Buffalo	0.295	Pacific Coast, ship plates	1.335
Cleveland	0.24	Birmingham	0.765
Detroit	0.325	Jacksonville, all rail...	0.555
Cincinnati	0.325	Jacksonville, rail and	
Indianapolis	0.345	water	0.46
Chicago	0.38	New Orleans	0.515
St. Louis	0.475		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c. rods, wire rope, cable and strands, 51c.; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2 1/2c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, 1/4 in. thick and over, and zees, structural sizes, 1.50c.

Sheared plates, 1/4 in. and heavier, tank quality, 1.40c. to 1.50c.

Wire Products

Wire nails, \$2.40 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of \$1.25 and shorter than 1 in., \$1.75; bright Bessemer and basic wire, \$2.25 per 100 lb.; annealed fence wire, Nos. 6 to 9, \$2.25; galvanized wire, \$2.75; galvanized barbed wire, \$3.05; galvanized fence staples, \$3.05; painted barbed wire, \$2.55; polished fence staples, \$2.55; cement-coated nails, per count keg, \$1.90; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 70 1/2 per cent off list for carload lots; 69 1/2 per cent for 1000-rod lots, and 68 1/2 per cent for small lots, f.o.b. Pittsburgh.

Bolts and Nuts

Machine bolts, small, rolled threads, 70, 10 and 10 per cent off list
Machine bolts, small, cut threads, 70 and 10 per cent off list
Machine bolts, larger and longer, 70 and 10 per cent off list
Carriage bolts, 1/2 in. x 6 in.:
Smaller and shorter rolled threads, 70 and 10 per cent off list
Cut threads, 70 per cent off list
Longer and larger sizes, 70 per cent off list
Lag bolts, 70, 10 and 5 per cent off list
Flow bolts, Nos. 1, 2 and 3 heads, 60 and 10 per cent off list
Other style heads, 20 per cent extra
Machine bolts, c.p.c. and t. nuts, 1/2 in. x 4 in.:
Smaller and shorter, 65, 10 and 5 per cent off list
Larger and longer sizes, 65 and 10 per cent off list
Hot pressed sq. or hex. blank nuts, \$5.50 off list
Hot pressed nuts, tapped, \$5.25 off list
C.p.c. and t. sq. or hex. blank nuts, \$5.25 off list
C.p.c. and t. sq. or hex. blank nuts, tapped, \$5.00 off list
Semi-finished hex. nuts:
1/2 in. to 9/16 in. inclusive, 80, 10, 10 and 10 per cent off list
Small sizes S. A. E., 80 and 10 per cent off list
1/2 in. to 1 in. inclusive, U. S. S. and S. A. E., 70, 10, 10 and 10 per cent off list
Stove bolts in packages, 80 and 5 tens per cent off list
Stove bolts in bulk, 80, 3 tens and 2 1/2 per cent off list
Fire bolts, 70, 10 and 5 per cent off list
Track bolts, carloads, 3c. to 3.25c. base
Track bolts, less than carloads, 3.75c. to 4c. base

Upset Square and Hex. Head Cap Screws

1/2 in. and under, 80 and 10 to 80, 10 and 10 per cent off list
3/8 in. to 1 in., 80 and 10 to 80, 10 and 10 per cent off list

Upset Set Screws

1/2 in. and under, 80, 10 and 5 to 85 per cent off list
3/8 in. to 1 in., 80, 10 and 5 to 85 per cent off list

Milled Square and Hex. Cap Screws

All sizes, 75 and 10 to 80 per cent off list

Milled Set Screws

All sizes, 70, 10 and 10 per cent off list

Rivets

Large structural and ship rivets, \$2.00 to \$2.10
Large boiler rivets, 2.10 to 2.20
Small rivets, .75 and 10 off list

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, \$36; chain rods, \$38; screw stock rods, \$43; rivet and bolt rods and other rods of that character, \$38; high carbon rods, \$45 to \$48, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, \$2 to \$2.25 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, 1/2-in., 5/8-in. and 7/16-in., \$2.15 to \$2.25 base; 5/16-in., \$2.15 to \$2.50 base. Boat and barge spikes, \$2.15 to \$2.50 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, \$3 to \$3.25 base per 100 lb. Tie plates, \$1.75 per 100 lb. Angle bars, \$2.40 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., \$9.30 per package; 8-lb. coating, 1 C., \$9.60; 15-lb. coating, 1 C., \$11.80; 20-lb. coating, 1 C., \$13; 25-lb. coating, 1 C., \$14.25; 30-lb. coating, 1 C., \$15.25; 35-lb. coating, 1 C., \$16.25; 40-lb. coating, 1 C., \$17.25 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.50c. from mill. Refined bar iron, 2c. to 2.10c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Steel			Butt Weld			Iron		
Inches	Black	Galv.	Inches	Black	Galv.	Inches	Black	Galv.
1/8	54 1/2	28	1/8 to 3/8	3 1/2	+ 22 1/2	1/8	36 1/2	18 1/2
1/4	60	33 1/2	1/4 to 1/2	4 1/2	27 1/2	1/4	42 1/2	27 1/2
3/8	65	50 1/2	3/8 to 1	4 1/2	29 1/2	3/8	44 1/2	29 1/2
1/2	69	56 1/2						
3/4	69	56 1/2						
1 to 3	71	58 1/2						
Lap Weld								
2	64	51 1/2	3	39 1/2	25 1/2			
2 1/2 to 6	68	55 1/2	2 1/2 to 6	42 1/2	29 1/2			
7 to 8	65	51 1/2	7 to 12	40 1/2	27 1/2			
9 to 12	64	50 1/2						
Butt Weld, extra strong, plain ends								
1/8	50 1/2	33	1/8 to 3/8	4 1/2	+ 37 1/2			
1/4	56	38 1/2	1/4 to 1/2	35 1/2	23 1/2			
3/8	62	50 1/2	3/8 to 1	42 1/2	28 1/2			
1/2	67	55 1/2	1 to 1 1/2	44 1/2	30 1/2			
1 to 1 1/2	69	57 1/2						
2 to 3	70	58 1/2						
Lap Weld, extra strong, plain ends								
2	62	50 1/2	3	40 1/2	27 1/2			
2 1/2 to 4	66	54 1/2	2 1/2 to 4	43 1/2	31 1/2			
4 1/2 to 6	65	62 1/2	4 1/2 to 6	42 1/2	30 1/2			
7 to 8	61	47 1/2	7 to 8	35 1/2	23 1/2			
9 to 12	55	41 1/2	9 to 12	30 1/2	18 1/2			

PERSONAL

C. J. McGregor, who has been assistant sales agent of the American Steel & Wire Co., at its Cleveland office, has been appointed sales agent for the company



C. J. MCGREGOR

in Buffalo to succeed E. A. Niven, who has been transferred to New York. P. B. Gilroy has been transferred from the company's Detroit office to succeed Mr. McGregor in Cleveland. Mr. McGregor has been with the company 20 years. He traveled the New England territory for 12 years and was then transferred to the Chicago and Milwaukee districts, where he served a year and eight months. He was made assistant sales agent in Cleveland in 1915 and effective April 1 this year, became sales agent at Buffalo.

A. L. Johnson, managing director of Richard Johnson, Clapham & Morris, Ltd., Manchester, England, is in the United States on a business trip. He is accompanied by A. W. Shaw of the same company.

Willard E. Freeland, for the past few years connected with the Winchester Repeating Arms Co., New Haven, latterly in the capacity of superintendent of sales production, has accepted a professorship in Massachusetts Institute of Technology, Boston. In his new work he will give the course in marketing which comes as the third term of business management. It is expected he will devote part of his time to consulting work. Before his engagement with the Winchester Repeating Arms Co. Mr. Freeland was New England editor of THE IRON AGE.

F. G. Davis, who has represented the Atlas Crucible Steel Co. in the Detroit district for the past three years, has resigned, effective April 1, to become district manager of sales in the Detroit district for the Electric Alloy Steel Co., Youngstown, Ohio. Mr. Davis will occupy temporary offices in Room No. 1716 Ford Building, Detroit. The company is installing a complete warehouse stock in Detroit, and the district offices will be moved to the new warehouse as soon as arrangements are completed.

A. F. Sparks has been elected president of the James Leffel & Co., Springfield, Ohio, to succeed the late George R. Prout. Harold A. Prout has been elected vice-president, succeeding Mr. Sparks.

Joseph S. Ruble has resigned as director, vice-president and construction manager of the Austin Co., Cleveland, to enter the general contracting business. Mr. Ruble, who is a member of the A. S. M. E., has had a wide construction experience.

R. W. Shore, formerly manager of the New York office of the Defiance Machine Works, Defiance, Ohio, has joined the sales organization of Russell, Holbrook & Henderson, New York, machine tool dealers.

James L. Gough, president and treasurer the National Machinery Sales Co., machine tool merchant, Chicago, has temporarily liquidated his business owing to continued ill health. It is Mr. Gough's intention upon his recovery to re-enter the machine tool business when its skies are clearer.

Lane Johnson has assumed his duties as chief engineer of the United Engineering & Foundry Co., Pitts-

burgh, having been previously engaged in consulting engineering work in the Pittsburgh district. He is a graduate of the Massachusetts Institute of Technology, and has a broad experience in mill work. Among the firms with which he has been connected are the Colorado Fuel & Iron Co., Kokomo Steel & Wire Co., American Rolling Mill Co. and Alex Laughlin.

C. E. Potts, superintendent of the sheet mills of the Inland Steel Co., Indiana Harbor, Ind., has resigned, effective April 1, on account of ill health, and will make his home in Los Angeles, Cal. Mr. Potts is succeeded by William H. Weichsel, formerly superintendent of the Dover mill of the American Sheet & Tin Plate Co., New Philadelphia, Ohio, as announced a week ago.

Robert Walker, formerly superintendent of foundries for the American Marine Iron Works, Portland, Ore., has been appointed superintendent of the B. & M. Foundry, Springfield, Ill.

Frederick O. Smith, secretary and manager of purchases of the Vulcan Iron Works, Wilkes-Barre, Pa., has returned after a several weeks' trip to California and the West.

James L. Richards, president Massachusetts Gas Co., Boston, which owns the New England Coal & Coke Co., who has been in Florida recuperating from a recent operation, is back at his desk, much improved in health.

Frank P. Mooney, who has been in the traffic department of the American Sheet & Tin Plate Co., Pittsburgh, for a number of years, recently was appointed assistant traffic manager of the company.

Charles W. Eckhardt, for many years purchasing agent for Milliken Brothers, Inc., and recently with Robert Grant, Woolworth Building, New York, became associated with the R. M. Baily Co., Philadelphia, April 1.

E. T. Pelton, vice-president Armstrong Steel Castings Co., Huntington, Ind., has resigned, effective April 1.

Frank C. Lewis, 4700 Kenwood Avenue, Chicago, who has been connected with the Charles G. Stevens Co., Chicago, for the past few years, has resigned. He was for many years Western manager for the Colonial Steel Co., Pittsburgh.

W. C. Peterson, metallurgical engineer for the Atlas Crucible Steel Co., has resigned, effective April 1, to accept the position of manager of alloy steel division with the Electric Alloy Steel Co., Youngstown, Ohio. Prior to the position which Mr. Peterson held with the Atlas Crucible Steel Co., he spent 12 years with the Packard Motor Car Co.

Charles F. Aumann, who at the sixteenth annual dinner of the Atkins Pioneers, employees of E. C. Atkins & Co., saw manufacturers, Indianapolis, was elected treasurer, has been with the company 52 years. When, as a boy, he began with the company, it employed 50 men; now there are about 2200 employees. William Weaver was elected president; Major M. Poole, vice-president, and C. A. Newport, re-elected secretary.

H. P. Parrock, who resigned some time ago from the Lumen Bearing Co., of Buffalo, still retains his interest in the Lumen Bearing Co. of Ohio, although an incorrect statement in this regard was printed in the issue of March 30. Mr. Parrock has sold his stock in the New York Lumen company, but as stated is still a stockholder in the Ohio company.

Howard Baker, formerly purchasing agent for the Mark Mfg. Co., Chicago, has been named by Assistant Secretary of the Treasury Wadsworth as director of supply in connection with reorganization by the Treasury Department of its purchasing activities by coordinating the work formerly exercised at about a score of different points. Mr. Baker will not only coordinate the purchases of the different services of the Treasury Department itself, but will represent the Treasury on the

Federal purchasing board. He is at present one of the assistants of the Director of the Budget and has been detailed to the Treasury Department in connection with this work.

Homer L. Ferguson, President of the Newport News Shipbuilding & Dry Dock Co., has been selected to serve as a member of the Claims Commission of the United States Shipping Board, by the President, without salary.

Thomas Towne, formerly vice-president and general manager of the Federal Tool & Alloy Steel Corporation, 66 Rutledge Street, Brooklyn, has been succeeded by V. H. Todd as general manager and Edward Munson as vice-president.

OBITUARY

LAWRENCE BATES JENCKES, director and a member of the development board, Crompton & Knowles Loom Works, Worcester, Mass., died at his home in that city, March 29, after a long illness, in his fifty-fifth year. Mr. Jenckes for some time was associated with the Westinghouse Electric & Mfg. Co., Pittsburgh. He was a member of the American Society of Mechanical Engineers as well as other societies.

GEORGE R. PROUT, president of the James Leffel & Co., water wheel and turbine manufacturers, Springfield, Ohio, died at his home in that city on March 17, aged fifty-three. He moved to Springfield in 1902, and had been associated with the Superior Drill Co. and American Seeding Machine Co. prior to his accepting the presidency of the Leffel Co. in 1919.

EDWARD P. MAGUIRE, general manager Lapointe Machine Tool Co., Hudson, Mass., since 1914, and associated with its business for many years previous, died March 28.

EDWARD WECK, aged fifty, cutlery manufacturer, died of hardening of the arteries March 28, at his home in Brooklyn. He was president of Edward Weck & Son, Inc., which has a plant in Brooklyn.

Wages in New York State Factories

According to the report of the State Industrial Commissioner, the average wages in factories of the State during January amounted to \$24.43 per week, compared with \$27.61 for January, 1921, and \$25.72, the average for the year 1921. The weekly earnings were 92 per cent higher than in June, 1914, while the corresponding price of food at retail, as reported by the United States Bureau of Labor Statistics, was only 43 per cent above June, 1914.

In the division covering metals, machinery and conveyances, the total payroll was reported as 65 per cent higher than in June, 1914, while the number of employees was 7 per cent below that of the earlier date. The average pay per employee in this group is therefore 77.5 per cent higher than formerly.

Active Demand for Rolls

Improvement in the steel business not only is reflected in larger rolling mill operations, but also in the demand for steel mill rolls. There is not much activity in plate mill rolls, because the demand for plates has not yet grown in proportion to that for other rolled products, but there is good buying of narrower rolls, notably for sheet and tin plate mills. In this connection it is interesting to note that the Canton Roll & Machine Works, owned by the American Sheet & Tin Plate Co., is running 100 per cent.

Frank P. Gilligan, national president, American Society for Steel Treating, was the guest and principal speaker at the regular monthly meeting of the Pittsburgh Chapter, held in the auditorium of the Bureau of Mines building, Pittsburgh, Tuesday evening, April 4. His subject was "Quality vs. Quantity."

Heavier Movement of Coal, Iron and Steel

WASHINGTON, April 4.—That the iron and steel and related industries registered a sharp recovery during the last quarter of 1921 as compared with the third quarter of that year and the corresponding period of 1920 is indicated by the reports of the Interstate Commerce Commission giving summaries of freight movements of Class I railroads. These carriers are those having annual operating revenues above \$1,000,000. Reports of Classes II and III railroads are not made to the commission, but it is estimated that the tonnage these latter two classes haul constitutes approximately 15 per cent of the total. On this basis, therefore, this percentage should be added to the tonnages on Class I roads in order to get the entire freight commodity movement.

Striking differences showing the increase in tonnage hauled during the last quarter of 1921 are apparent with regard to coal, coke, iron ore and steel products when compared with the third quarter of 1921 and the last quarter of 1920. In the case of coal, the tonnage hauled during the last quarter of 1921 on Class I roads totaled 286,830,937 tons, as against 70,765,728 tons for the third quarter, and 110,522,086 tons for the last quarter of 1920. Making a similar comparison with regard to iron ore, the respective figures are 29,576,590 tons, 14,785,154 tons, and 20,605,039 tons.

Comparative figures in detail in net tons follow:

	Quarters Ending		
	Dec. 31, 1921	Sept. 30, 1921	Dec. 31, 1920
Bituminous coal	286,830,937	70,765,728	110,522,086
Coke	10,214,239	1,673,609	6,871,501
Iron ore	29,576,590	14,785,154	20,605,039
Iron, pig and blooms	5,811,365	1,122,934	339,501
Rails and fastenings	2,550,492	552,511	87,789
Bar and sheet steel, structural steel and steel pipe	13,737,180	2,724,792	230,345
Other metals, pig, bar and sheet	2,456,210	525,270	15,816
Castings, machinery, and boilers	4,298,901	959,694	73,988

Will Take Over Graham Nut Co.

The Jones & Laughlin Steel Co., Pittsburgh, has secured an interest in a new company to be known as the Graham Bolt & Nut Co., which will take over the Graham Nut Co., maker of nuts, bolts and lag screws, which has a plant on Neville Island and general offices, of which are on West Carson Street, Pittsburgh. Harry C. Graham, president, and Charles J. Graham, vice-president, of the Graham Nut Co., are joint owners with the Jones & Laughlin Steel Co. in the new company, in which they will retain their present positions, while S. W. Gray, secretary and treasurer of the old company, retains that position with the new organization. Albert Graham, who has been identified with the organization since 1880, and who for several years has been chairman of the board of directors, retires from active participation in the business. The present capacity of the company's plant will be considerably enlarged and new lines of products added, notably track bolts and rivets. The Graham Nut Co. was one of the first to adapt steel to the manufacture of nuts, and grew out of the firm of Charles & McMurtry, founded in 1874, with a plant on Sixteenth Street, Pittsburgh, by William Charles and George G. McMurtry. The firm subsequently became William Charles & Co., and later John Charles & Co., and the plant was removed to Allegheny. The controlling interest was purchased in 1896 by Albert Graham, and he, with his two sons, Harry C. and Charles J., formed a partnership under the name of the Graham Nut Co. The company was incorporated in 1903, and subsequently was removed to a new plant on Neville Island.

Higher Scrap Prices

YOUNGSTOWN, April 4.—A sale of heavy melting scrap has been made at \$17.25, which compares with recent high of \$16.50 and previous level of \$14 to \$14.50. Hydraulically compressed scrap is quoted at \$15, which is up \$2.50 to \$3 from recent levels. The price situation reflects the demand for scrap for steel making.

Machinery Markets and News of the Works

MARCH SHOWS A SLIGHT GAIN

Machine-Tool Business, However, Has Not Picked Up Materially

Better Demand for Steel Mill Equipment and the Crane Market Is Fairly Active

While March machine-tool business was more satisfactory than that of February, there was no such improvement as occurred in the steel industry. March sales showed a fair gain over the preceding month, particularly in the Central West. Business continues very quiet in the East.

A disappointment to the trade is the lack of machine-tool buying of importance by the railroads. Notwithstanding the fact that the railroads are buying rather freely of rolling stock, car repair material and track supplies, very little is being done in the rehabilitation of machine shops.

The Santa Fe, which has issued many inquiries recently at Chicago, has put out another for four 20-in. lathes, and it is expected that this road will place some orders within a week. Other railroad inquiry and buying are unimportant. The New York has placed an order for two machines, the Illinois Central is inquir-

ing for a lathe and the Chicago, Burlington & Quincy has asked prices on two tools.

Industrial plants are not large buyers, purchases being confined almost entirely to single machines, and very often used machines are taken in preference to new tools because of the saving in price. The Johns-Manville Co., New York, is reported to have closed on a small list of tools for its Waukegan, Ill., plant.

An indication of the forward movement in the automobile industry is the order for 100,000 Continental motors placed by the Durant Motors Co., Lansing, Mich. The Maxwell Motor Corporation is in the market for a number of woodworking machines for its body-building plant at Dayton, Ohio. The Chandler Motor Car Co., Cleveland, is inquiring for four polishing lathes.

Steel mill equipment is in better demand. The West Leechburg Steel Co. has placed an order with the Treadwell Engineering Co., Easton, Pa., for a 16-in. continuous hot strip mill and cooling beds, and the electrical equipment, amounting to about \$200,000, will be built by the Westinghouse Electric Mfg. Co.

The Youngstown Board of Education has issued an inquiry for 40 machines, mostly for woodworking purposes.

Crane demand continues active, particularly in the Pittsburgh district.

New York

NEW YORK, April 4.

A slight improvement is noted in the number of inquiries for machine tools, but there is still a great deal of hesitancy among buyers in placing orders. March was slightly better than February, but the change for the better was not sufficient to change sentiment to one of optimism.

Grover A. Whalen, Commissioner of Plant and Structures, Municipal Building, New York, will soon call for bids for the construction of two, and possibly three, electrically-operated ferry boats for the Staten Island service, to include complete electric power plants, with turbine-gearing, pumping machinery, etc.

The crane market is quiet with a number of small inquiries still pending. The Watson Machine Co., Paterson, N. J., which was in the market for a 15-ton, 40-ft. span crane, is stated to have postponed purchase for about one month. The 110-ton power house crane for the West Penn Power Co. has not yet been placed. Decision and award on this crane will be in the Pittsburgh district. Among other inquiries about to close is one for a 5-ton, 34-ft., 8½-in. span electric crane for the Habirshaw Electric Cable Co., Yonkers, N. Y. Activity is marked in crawl tread cranes in the Middle West. The Northwest Engineering Co. reports sales of 12 cranes in March; six dragline cranes and six standard cranes. The Shepard Electric Crane & Hoist Co. reports that March sales on the "Liftabout," a small electric hoist recently brought out by this company, total 100 of ½-ton and 1-ton capacities.

Among recent sales were: Northwest Engineering Co., a 10-ton crawl tread crane equipped with Haywood bucket to the Standard Bitulithic Co., 50 Church Street New York; Arthur Appleton, 29 Broadway, New York, a 3-ton, 19-ft. span Reading hand power crane to the Northwestern Mining & Exchange Co., 50 Church Street, New York, for Brockwayville, Pa.; Niles-Bement-Pond Co., a 10-ton, 57-ft. span overhead traveling crane to the Palmer Steel Co., Holyoke, Mass.; Champion Engineering Co., a 10-ton, 46-ft. span overhead traveling crane to the Differential Steel Car Co., Findlay, Ohio; Whiting Corporation, a 25-ton, 1-motor, overhead traveling crane to the Manchester Traction, Power & Light Co., Manchester, N. H.

The Municipal Gas Co., Albany, N. Y., will take bids at once for a one-story addition to its Riverside electric power plant, 52 x 170 ft. Thomas E. Murray, 50 Duane Street, New York, is engineer.

Stroh & Wilson, 514 West 125th Street, New York, pipe, brass goods, plumbing supplies, etc., have purchased property, 50 x 100 ft., on 125th Street, for new works. Plans will be prepared at an early date.

J. L. McInerney, 311-17 State Street, Elmira, N. Y., operating a forge and machine works, will install new forging equipment, blower apparatus, and machine tools.

The Eastern Malleable Iron Works, Twenty-fifth Street, Troy, N. Y., will break ground at once for a one-story power plant, 50 x 185 ft.

M. I. St. John, care of George Keister, 56 West Forty-fifth Street, New York, is having plans completed for a four-story automobile service and repair works at 174th Street and the Grand Concourse, to cost \$125,000.

The Freed-Elseman Radio Corporation, 255 Fourth Avenue, New York, manufacturer of wireless equipment, has leased an additional floor at its present location for increased production.

A vocational department will be installed in the high school to be erected at Hornell, N. Y., to cost about \$450,000, bids for which will be received until April 25. Tooker & Marsh, 101 Park Avenue, New York, are architects.

The Foundation Co., 120 Liberty Street, New York, will assemble at once a complete construction plant with machinery for shipment to Belgium, to be used for rebuilding the Louvain University Library, for which the company has secured the contract. The cost will approximate \$1,000,000.

The Superintendent of Public Works, Albany, N. Y., will soon commence the construction of a ship repair yard at Waterford, N. Y., for the Eastern Division of the State Barge Canal. It will consist of a dry dock, with main machine, wood-working and iron-working shop, 70 x 200 ft. The initial expenditure will total \$100,000, and to which will be added an appropriation of about \$200,000 next year for other features of the plant. Charles L. Cadle is superintendent.

The United States Engineer Office, Room 710, Army Building, New York, will receive bids until April 17 for the construction of one steel oil barge and one steel water barge.

The Manati Sugar Co., 112 Wall Street, New York, is disposing of a bond issue of \$8,000,000, a portion of the proceeds to be used for extensions and improvements in its sugar mill and narrow-gauge railroad lines at the eastern end of Cuba. Regino Truffin is president.

Fire, March 31, destroyed the one-story foundry of the Plainfield Brass Foundry Co., West Front Street, Plainfield, N. J.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until April 25, schedule 9554, for 18,000 steel powder tanks for Lake Denmark, N. J.; also for 12,000 steel powder tanks for Fort Mifflin, Pa.

The Auto-Treat Co., Perth Amboy, N. J., recently incorporated with a capital of \$100,000, is planning for the establishment of a factory to manufacture gasoline and oil pumping machinery and parts. Abel Hansen, head of the Fords Porcelain Works, Lehigh Avenue, Perth Amboy, will be president of the new company.

A vocational department will be installed in the two-story high school to be erected at Point Pleasant, N. J., estimated to cost about \$50,000. Clinton B. Cook, Asbury Park Trust Building, Asbury Park, N. J., is architect.

The Richelleu Motor Corporation, 649 Mattison Avenue, Asbury Park, N. J., has been incorporated under Delaware laws with capital of \$2,000,000 to erect a plant for the manufacture of automobiles. It has a tract of land on Asbury Avenue and has had plans drawn for a one- and two-story plant, 80 x 200 ft., estimated to cost \$200,000, including machinery. Samuel A. Reeves is president and Robert G. Poole, treasurer.

The Board of Education, Franklin, N. J., will commence the immediate erection of an addition to the vocational school, estimated to cost about \$190,000.

A one-story power house will be erected by the National Oil Supply Co., Frelinghuysen Avenue and Bigelow Street, Newark, N. J., to cost about \$17,000.

The Public Service Electric Co., Public Service Terminal, Newark, N. J., is arranging an appropriation of \$10,000,000, to be expended during the next 36 months for extensions and improvements in power plants and system. About one-half of the fund will be used during the present year, to include the installation of two new generators and boilers, and auxiliary machinery, at the Essex power plant, estimated to cost in excess of \$3,500,000; new equipment at the Camden and Burlington, N. J., power plants, costing \$170,000 and \$379,000 respectively. An addition will be constructed to the testing laboratory at the Marion power plant, Marion, near Jersey City, for the installation of pulverized fuel burning testing apparatus. New electric substations and line extensions are estimated to cost in excess of \$500,000.

New England

Boston, April 3.

Little encouragement was derived by local machine-tool dealers in going business in the closing days of March. That month will prove the least profitable so far this year to a majority of the local firms. Sales the past week were mostly individual machines and involved small cash outlay. The most notable exception was the purchase by a Chelsea, Mass., maker of radio appliances of a 16-in. x 8-ft. Worcester made engine lathe, a precision bench lathe and about \$14,000 worth of hydraulic machinery. Other sales included a 13-in. x 5-ft. lathe to a Fall River textile mill; two 9-in. x 4-ft. lathes to two greater Boston garages; a 16-in. x 8-ft. lathe to a Lynn farming interest; a 16-in. x 8-ft. quick change gap lathe to a Somerville garage; a No. 4 Consolidated press to a Providence manufacturer; two used Belton gear cutters to a Springfield maker, and a 20-in. shaper to an Everett manufacturing interest. Sales of single machines, mostly lathes, to South American and Spanish concerns are noted, the first export business reported in several months.

The outlook for April is fairly encouraging. The Connecticut field indicated more activity than during the past two years, and local dealers have a fairly large number of quotations out in Massachusetts, Maine and Rhode Island. Vermont is producing fewer prospects than any other New England state, the sale of an upright drill and a small lathe to a Rutland garage, reported this week, being the first business placed in some time. The purchase of a fairly large number of small machine tools is under consideration by interests going into the manufacture of radio apparatus. The large New England industries, such as the General Electric the Westinghouse Electric, the United Shoe Machinery Corporation, American Steel & Wire, automobile manufacturers, and road machinery makers are all becoming more active, and are expected to be factors in the machine tool market later. In Connecticut, hardware manufacturers

are busier, and such concerns as the New Departure Mfg. Co., Bristol, are employing more people than at any previous time this year. The New Departure Mfg. Co. is installing a gas carburizing furnace for experimental purposes, a pot dumping device in its annealing department, and other equipment.

New England shipyards are the least active industries. Activity at the Fore River works, Bethlehem Shipbuilding Co., Ltd., is down to a minimum, a large Portsmouth, N. H., yard, according to a report just issued by a Government official, is hopelessly bankrupt, while the Bath, Me., plant of the Texas Co. is closed and the steel, machinery, lumber, etc., being sold as fast as possible. The Bath Iron Works is increasing its force gradually, but will not require a large crew to handle the building of Government lightships under contract.

The Maine Motor & Engineering Co., 17 Somerset Avenue, Winthrop, Mass., contemplates going into the manufacture of radio apparatus and is inquiring for machine tools.

The Industrial Development Co. acting for the National Can Co. plans the erection of a plant, 92 x 160 ft.; a garage, 20 x 60 ft., and a storage building, 20 x 40 ft. on Locust Street, South Boston. Plans will be ready about May 1.

The Remington Oil Engine Co., Stamford, Conn., has been reorganized and plans to erect new manufacturing units in Glenbrook, Conn., on property bordering the New York, New Haven & Hartford Railroad. The company went into receivership in February, 1921. Winthrop A. Clark is now president and chief engineer; J. Edward Brown, vice-president and general manager, and Peter T. Dondlinger, secretary-treasurer. The offices of the company will remain in Stamford.

Pratt Brothers, North Grafton, Mass., contemplate the erection of a coal pocket. Details have not yet been worked out.

Contract has been awarded for a one-story, 24 x 45 ft. machine and carpenter shop and other improvements by the Colwell Worsted Mills, Providence, R. I.

Coal-handling machinery will be needed for a 2000-ton coal pocket to be erected by the Tuxis Coal Co., 553 North Colony Street, Meriden, Conn., plans for which are being drawn.

A machine and repair shop will be installed in the new fire house building to be erected on St. John Street, New Haven, Conn., by the city. Norton & Townsend are the architects.

The Atlas Die Casting Co., Worcester, Mass., has been reorganized with J. Herbert Johnson, recently assistant sales manager the machine division of the Norton Co., as general manager and treasurer. The president is Edward G. Norman, and the other directors Nathan Lester and Malcolm A. Blanch. Mr. Lester is the engineering member of the executive staff. He was formerly with the Doehler Die Casting Co. and the Acme Die Casting Co., both of Brooklyn. Mr. Blanch is the superintendent. The business was established a year ago, and the corporation has a capital stock of \$200,000. The company occupies the four-story building at 29 Jackson Street, Worcester, which is newly equipped throughout for the manufacturer of die castings of zinc and bronze metals. Twenty die-casting machines will be in operation in a few weeks and it is expected that 60 men will be employed within two months.

A vocational department will be installed in the two-story and basement high school, 92 x 150 ft., to be erected at Madison, Me., to cost \$220,000. H. S. Combs, 11 Lisbon Street, Lewiston, Me., is architect.

Fire, March 25, destroyed a portion of the works of the Up-to-Date Tool Co., in the Badger Building, 535 Albany Street, Boston, and the plant in the same building of the Dickerman Box Co., manufacturer of paper boxes, with combined loss estimated at \$60,000.

Corson Brothers & Co., Bangor, Me., are planning the erection of new hydroelectric generating plant at Six Mile Falls, where about 160 acres has been acquired. Work will commence during the summer.

The Bush Mfg. Co., 100 Wellington Street, Hartford Conn., manufacturer of automobile radiators, etc., has filed plans for a one-story addition, 50 x 250 ft., to cost \$40,500. Buck & Sheldon, Inc., 60 Prospect Street, are architects and engineers.

The American Steel & Wire Co., Grove Street, Worcester, Mass., is planning the erection of a one-story addition, 60 x 100 ft., for steel galvanizing work. C. E. Goodrich is company engineer.

The plant and equipment of the G-O Tractor Corporation, Derby, Conn., will be sold at public auction. The Cedar Rapids, Iowa, plant of the company will also be offered on April 12.

A one-story power house, 50 x 62 feet, will be erected by the Inland Paper Board Co., Versailles, Conn.

Motors and other electric power and mechanical equip-

ment will be installed in the four-story plant, 80 x 270 ft., to be constructed by the Dennison Mfg. Co., Framingham, Mass., at Marlboro, Mass., for the manufacture of paper boxes, etc., estimated to cost \$500,000, with machinery. Contract has been let to the Aberthaw Construction Co., 27 School Street, Boston.

Buffalo

BUFFALO, April 3.

The Maxwell Steel Vault Co., 4 Warner Street, Oneida, N. Y., has completed plans for the erection of the first unit of a new plant, one-story, 60 x 90 ft.

The A. W. Jack Corporation, Lockport, N. Y., manufacturer of asbestos products, has plans nearing completion for new works to cost \$350,000, including machinery, on site purchased at Mill Street and North Transit Road, totaling about 8 acres. Work will be started early in May. George F. Hardy, 309 Broadway, New York, is engineer.

The International Harvester Co. of America, 487 Seneca Street, Buffalo, has leased the building now in course of erection at Pennsylvania, Retreat and Woodbrook avenues, totaling about 18,000 sq. ft., and will use it as a service and repair works, and for other operating service.

The Wickwire Limestone Co., Gasport, N. Y., is planning to rebuild the portion of its works destroyed by fire March 23, with loss estimated at \$50,000, including crushing and other machinery.

The Hoffman Packing Co., 315 Free Street, Syracuse, N. Y., operated by A. C. Hoffman & Son, has had plans completed for a five-story and basement cold storage and refrigerating plant, 30 x 60 ft. Henschein & McLaren, 1637 Prairie Avenue, Chicago, are architects.

A vocational department will be installed in the three-story high school, 150 x 200 ft., to be erected at Owego, N. Y., to cost \$265,000, and for which Coffin & Coffin, architects, 522 Fifth Avenue, New York, will prepare plans.

The Thompson Foundry Co., Oliver Street, Silver Creek, N. Y., will install new equipment for the production of iron and brass castings, heat-treating apparatus, etc.

The Department of Public Works, Syracuse, N. Y., has preliminary plans under way for a new pumping plant, in connection with the municipal garbage reduction works.

E. T. Gaige, 235 Vestal Avenue, Binghamton, N. Y., has awarded a contract to Clark & Staples, Rossville, N. Y., for a one-story machine and repair shop to cost about \$35,000.

A vocational department will be installed in the three-story high school, 145 x 200 ft., to be erected at Batavia, N. Y., estimated to cost about \$500,000. E. E. Joralemon, 482 Delaware Avenue, Buffalo, is architect.

The Meyers Co., Cameron, N. Y., will install power grinding machinery, drill press and other equipment at its machine works.

A vocational department will be installed in the proposed high school to be erected at Attica, N. Y., estimated to cost about \$300,000.

Chicago

CHICAGO, April 3.

The machinery market is quiet with the opening of April, with nothing to indicate that any marked change in the situation is due. While the month just closed was more satisfactory than February, the degree of improvement was by no means comparable with that which occurred in the steel market. Railroad buying is slow in developing. The Illinois Central has placed an order for a 24-in. x 12-ft. engine lathe and the Burlington has put out an inquiry for a 1½-in. triple-head bolt cutter and a heavy-duty drill similar to a No. 314 Baker. The Santa Fe has put out additional inquiries, including four 20-in. lathes, an emery wheel stand and a boiler maker's flange clamp, and is expected to place a number of orders against its pending list soon. No large purchases by industrial concerns have been reported. The Johns-Manville Co., which has resumed construction of its new plant at Waukegan, Ill., is said to have purchased part or all of its outstanding list of tools at New York. A report that the Universal Portland Cement Co. had bought against the list which it issued recently is denied, it being stated that the appropriation to cover the purchase of the machines has not yet been secured.

The W. K. Millholland Machine Co., Indianapolis, has announced a reduction on turret lathes of about 20 per cent.

The Santa Fe is in the market for a 15-ton electric traveling crane. The Shaw Electric Crane Co. has received an order from Joseph T. Ryerson & Son for two crane trolleys. The Whiting Corporation has the following orders: A 25-ton hand power crane with 60-ft. span for the Ottumwa, Iowa, Railway & Light Co.; a two-yard, 40-ft. span bucket crane for the Calumet station of the Commonwealth Edison Co., Chicago; No. 3½ cupola for the Builders' Specialty Co.,

Chicago; No. 3 cupola for the General Boilers Co., Waukegan, Ill.; No. 3 cupola for the Domez Foundry Co., Grand Crossing, Chicago, and a battery of six tumbling barrels for the new plant of the Niagara Radiator Co. at Chicago.

The Durant Motors Co. has placed an order for 100,000 motors with the Continental Motors Co., Muskegon, Mich. These motors will be used in a touring car to sell for \$348, which will be manufactured at Lansing, Mich.

N. Forte & Brothers, 2059 Ogden Avenue, Chicago, are taking bids on a one-story garage, 100 x 124-ft., at 251-57 North Crawford Avenue, to cost \$50,000.

The Great Northern Railway, St. Paul, Minn., contemplates the construction of a one-story car repair shop, 40 x 300 ft., at Minot, N. D., to cost \$85,000. It will soon receive bids on the construction of terminal facilities at Wenatchee, Wash., including a 24-stall roundhouse, storehouse, coaling station, water supply equipment, boiler washing plant, etc.

The Greenduck Metal Stamping Co., 2127 Tilden Avenue, Chicago, has been incorporated with \$100,000 capital stock to manufacture metal specialties, such as rules, gages, medals, key tags, key rings, match cases, desk calendars, watch fobs, bookmarks, etc. It has taken over the business of the Greenduck Co. and has a fully equipped plant at the address given. William U. Watson is president.

The Will County Welding Co., 221 South Chicago Avenue, Joliet, has been incorporated with \$10,000 capital stock. It is a subsidiary of the Powers-Thompson Construction Co., Joliet, and was formed principally to do welding work for that company and a number of other affiliated companies. The business will be commercialized, however, if it works satisfactorily.

The Combustion Co., 174 North Michigan Avenue, Chicago, has leased a plant at 4256 North Western Avenue, Chicago, with 14,000 sq. ft. of floor space, which will be equipped to manufacture automatic fuel oil burning equipment. It is in the market for three engine lathes, one shaper, one milling machine, one small hand screw machine, one medium hand screw machine, a 20-inch drill press, two small drill presses, one speed lathe, one hacksaw, an arbor press, and miscellaneous equipment, such as shafting, vises, drills, drill chucks, reamers, etc. The officers are: President, William T. Dean; vice-president, Cecil De Groot; secretary and treasurer, J. F. Kennedy.

The Rich Steel Products Co., Battle Creek, Mich., will erect a foundry machine shop, assembling building and warehouse for the production of the new patent aluminum lawn mower. It will have the six blades instead of the customary three, and will weigh only half as much as the average lawn mower.

The Davenport Loan & Investment Co., Davenport, Iowa, has purchased a portion of a former glucose plant in that city for the reported purpose of using it to manufacture a new concrete road finishing machine. Patent rights on the machine have been secured and negotiations are under way for the formation of a corporation to manufacture and market it.

The Commonwealth Edison Co., Chicago, has purchased property at 707-715 South La Salle Street as a site for the construction of a sub-station.

The Venetian Liberty Coaster Co., 517 North Western Avenue, Chicago, has let contract for a one-story factory, 50 x 116 ft., at 5007-9 West Grand Avenue, to cost \$8,000.

The Mount Vernon Car Co., Mount Vernon, Ill., has awarded a contract to the Hughes-Foulkrod Co., Pittsburgh, for a one-story foundry, 130 x 550 ft., to cost in excess of \$200,000, including machinery. W. C. Archer is president.

The Rockford Electric Co., Rockford, Ill., is planning for an addition to its power plant and extensions in its system to cost about \$350,000.

The Chicago Wheel & Spring Co., 414 West Thirty-fourth Street, Chicago, is taking bids for a new two-story and basement factory on East Thirty-fourth Street, 50 x 50 ft., to manufacture automobile wheels and springs, estimated to cost \$30,000. Z. Erol Smith, 305 East Fifty-fifth Street, is architect in charge.

A vocational department will be installed in the two-story high school, 70 x 100 ft., to be erected by the Savanna Township Board of Education, Savanna, Ill.

The Chicago, Rock Island & Pacific Railroad Co., La Salle Street Station, Chicago, is planning for the erection of a new machine shop and wood-working plant at Cedar Rapids, Iowa. A new water-treating plant will also be installed. The work is estimated to cost \$100,000. A. T. Hawk is engineer of buildings for the company.

The Velva Coal Products Co., Velva, N. D., has plans under way for a new electric power plant, estimated to cost \$500,000. The Dakota Engineering Construction Co., Valley City, N. D., is engineer; W. J. Bliss, Valley City, heads the company.

The Northern Iowa Gas & Electric Co., Humboldt, Iowa,



Asphaltum for roofing purposes is exported by the Paraffine Companies, Inc., San Francisco, in special steel barrels of light construction designed so that the steel can be easily stripped off with an ax, leaving the asphalt free and in a solid state. The steel drums are made straight up and down in order to take minimum space. Special equipment has been designed for filling the barrels, by means of which one operator can fill 500 bbl. in 8 hr.

is arranging for an increase in capital from \$1,000,000 to \$3,000,000, a portion of the proceeds to be used for extensions and improvements in power plants and system.

The General Iron Works Co., Denver, Col., has acquired about 18 acres at Englewood, Col., and has plans under way for the erection of works estimated to cost \$750,000, including machinery. The company is formed of the Colorado Iron Works, Denver Engineering Works, Stearns-Rogers Mfg. Co., and the Queen City Foundry Co., and all of these different units will have space at the new plant.

The Western United Gas & Electric Co., Aurora, Ill., has plans under way for extensions and improvements in its power plant and system in the Fox River district, estimated to cost \$1,000,000.

A vocational department will be installed in the new three-story and basement high school to be constructed at Webster City, Iowa, estimated to cost \$225,000. William Gordon, 317 Hubbell Building, Des Moines, is architect.

The Merkle-Korff Gear Co., 313 South Clinton Street, Chicago, will purchase a number of machine tools and other shop equipment.

The East St. Louis & Suburban Railway Co., East St. Louis, Ill., will make extensions and improvements in its electric power plant and system to cost about \$500,000. Of this amount, approximately \$100,000, will be used for work in the Alton section.

A vocational department will be installed in the three-story and basement high school, 150 x 190 ft., to be erected at Fort Dodge, Iowa, estimated to cost \$260,000. Owen, Payson & Carswell, Interstate Building, Kansas City, Mo., are architects.

Philadelphia

PHILADELPHIA, April 3.

The Ritter Can & Specialty Co., Philadelphia, has purchased the two-story factory, 100 x 140 ft., at 1026-28 Sedgley Avenue, which it will occupy for the manufacture of tin cans and other metal products. Possession will be taken at once. The plant of the company at 1517-45 North Hutchinson Street was destroyed recently by fire with loss of about \$400,000.

A one-story power house will be erected by the Cambria Silk Hosiery Co., Indiana and A streets, Philadelphia, at its new mill on Loudon Street, plans for which are being prepared by the William Steele & Sons Co., 1600 Arch Street.

A one-story power house will be erected by the Hensel-Colladay Co., Twelfth and Wood streets, Philadelphia, at its new millinery factory at Twenty-first Street and Hunting Park Avenue. William H. Hensel is president.

J. G. Boggs, 1910 North Fourth Street, Philadelphia, will purchase lathes, shaper and other machine tool equipment for his machine shop.

The Automotive Battery & Electric Co., 1317 Race Street, Philadelphia, has leased property at 215-17 North Fifteenth Street for new works.

The American Ice Co., Sixth and Arch streets, Philadelphia, will build a new ice-manufacturing plant on Willard Street.

A one-story machine shop will be installed at the new

mill of the Andross Worsted Co., Bridge and Charles streets, Philadelphia, to cost \$350,000. The Ballinger Co., Twelfth and Chestnut streets, is architect.

The United Ice & Coal Co., Forster and Cowden streets, Harrisburg, Pa., will commence the immediate erection of a two-story ice-manufacturing and refrigerating plant, 100 x 170 ft., to cost about \$50,000.

A one-story power house will be erected by the board of directors, St. James Mercy Hospital, Chester, Pa., in connection with a new main building at the institution.

The Bucks County Electric Co., Doylestown, Pa., has preliminary plans under consideration for a new electric generating plant, supplementing the present station at Yardley, Pa.

A vocational department will be installed in the two-story high school to be erected at Ambler, Pa., estimated to cost \$125,000. S. S. Conover, Lansdale, Pa., is architect.

The Watsontown Door & Sash Co., Watsontown, Pa., will immediately rebuild the section of its plant destroyed by fire March 26 with loss estimated at \$150,000, including equipment.

A power house will be erected by the A. S. Kreider Shoe Co., Eighth and Water streets, Lebanon, Pa., in connection with a new four-story factory at Tamaqua, Pa., estimated to cost \$110,000.

Traveling crane, hoisting engines, steam shovel, portable forge shop and other equipment of the Hamilton-Kapnek Construction Co., Houstons Crossing, Wilkes-Barre, Pa., will be offered at public sale April 22.

A vocational department will be installed in the one and two-story high school to be erected at Haverford, Pa., estimated to cost in excess of \$200,000.

A vocational department will be installed in the three-story high school to be erected at Pottstown, Pa. Ritter & Shay, North American Building, Philadelphia, are architects.

Yard cranes, fabricating machinery, power plant machinery, tanks and other miscellaneous equipment at the plant of the Merchant's Shipbuilding Corporation, Bristol, Pa., will be offered at public sale on the premises April 25 and 26 by the United States Shipping Board Emergency Fleet Corporation, Washington.

The Defiance Auto Lock Co., 836 Hamilton Street, Allentown, Pa., has arranged for a preferred stock issue of \$150,000, the proceeds to be used for the purchase of machinery and plant facilities for the manufacture of automobile locking devices. A list of requirements has been prepared. A. C. Kleckner is in charge.

Pittsburgh

PITTSBURGH, April 3.

Cranes and heavy equipment still show much activity in this district but machine-tool business remains inactive with the bulk of the orders for one or two tools. There is so much prospective business in cranes, mills and electrical equipment that manufacturers of those lines take a very hopeful view of the future, but optimism is not discernible among the machine-tool trade, at least not among those who represent manufacturers who prefer to keep their plants idle rather than meet present competition. The trend of demand

is toward low-priced tools that will do the work. Liquidating sales by manufacturers still are in progress and prices are so low as to crowd out those offering equipment on which relatively stiff prices must be obtained. There seems to be a steady flow of used tools from companies which bought only to find the need no longer existed, or which have fallen by the wayside in the depression of the past two years.

The Pittsburgh Supply Co., Pittsburgh, in the past week closed for two 10-ton Euclid cranes. The Pittsburgh Brazing, Welding & Machine Co., has bought two 5-ton, 23-ft. span Pauling & Harnischfeger hand-operated cranes. The Standard Steel Car Co., Butler, Pa., is in the market for a 3-ton, hand-power crane for shipment to Buenos Aires and the Pittsburgh-Des Moines Steel Co. has asked for bids on a 10-ton, 3-motor crane, 23-ft. 9-in. span, for a riveting tower. The Shepard Electric Crane & Hoist Co. has taken, through its Pittsburgh office, a high-speed 80-ft. span grab bucket crane with 3 cu. yd. bucket for the Louisville Cement Co., Louisville, Ky., and a 5-ton, 2-motor hoist for installation at the Ashland, Ky., works of the American Rolling Mill Co. The Shepard company now is marketing, through agencies throughout the country, small hoists for which a demand of considerable proportions lately has been developed.

Electrical equipment orders still are fairly frequent. The Westinghouse Electric & Mfg. Co. has taken an order for 16 single-phase air blast transformers for the Philadelphia Electric Co. and also the electrical equipment in connection with the new 16-in. continuous hot strip mill to be installed by the West Leechburg Steel Co. The latter order, which amounts to close to \$200,000, includes two 1500-hp. d.c. variable speed motors, two 1500-hp. a.c. 710 r.p.m. motors, two 1800-hp. a.c. variable speed motors and two 2000-kw. motor generator sets, together with switch board and controls. Contract for the mill and the cooling beds was awarded the Treadwell Engineering Co., Easton, Pa. This mill has 20-in. roughing stands and 16-in. finishing stands.

The Clarion River Power Co., Pittsburgh, has arranged for a stock issue of \$20,000,000, the proceeds to be used in part for the development of a site and construction of a hydroelectric generating plant on the Clarion River.

The Pittsburgh High Voltage Insulator Co., Derry, Pa., will soon commence the erection of a one-story building at its plant, 96 x 160 ft.

The Blystone Mfg. Co., Cambridge Springs, Pa., manufacturer of concrete mixing machinery, etc., is planning to rebuild its local works, recently destroyed by fire. Pending re-construction, the company has leased the plant of the Triangle Tool Co., Eighth and Cambridge Streets, Erie, Pa., and will operate at this location.

The Koppel Car Repair Co., Koppel, Pa., a subsidiary of the Pressed Steel Car Co., Farmers' Bank Building, Pittsburgh, will build a new one-story plant, 60 x 500 ft., at Koppel.

The Wolf Coal Co., Wheeling, W. Va., will commence the immediate construction of a new tippie at its plant.

The City Council, Piedmont, W. Va., is arranging for the installation of a new pumping plant at the municipal waterworks to cost about \$25,000.

The Diamond Ice & Coal Co., Charleston, W. Va., is planning the construction of a two-story ice-manufacturing factory, 100 x 100 ft., with adjoining two-story structure, 30 x 70 ft., for machinery.

The Liberty Airless Tire Co., Parkersburg, W. Va., is considering the erection of a new plant at Huntington, W. Va., with an initial output of 2,000 tires per day. C. Lewis Wilson is head.

The West Virginia & Maryland Power Co., Pittsburgh, a subsidiary of the West Penn Railways Co., has acquired the plant and property of the Elkins Power Co., Elkins, W. Va. Extensions and improvements will be made, and the system connected with the other lines of the company.

The Bluefield Ice & Cold Storage Co., Bluefield, W. Va., will commence the immediate erection of a new ice-manufacturing plant to cost about \$60,000.

The Allegheny County Commissioners, Pittsburgh, are planning for the installation of new mechanical conveying apparatus at the two county asphalt plants.

The Horner Ice Co., P. O. Box 237, Clarksburg, W. Va., recently organized, is arranging for a new ice-manufacturing plant, 40 x 100 ft. J. Lee Horner is president and treasurer.

Fire, March 27, destroyed a portion of the works of the Libbey-Owens Sheet Glass Co., Kanawha City, W. Va., with loss estimated in excess of \$150,000, including equipment. Headquarters of the company are in the Nicholas Building, Toledo, Ohio.

The Hill Motor Co., Iaeger, W. Va., is planning for a new service and repair works estimated to cost about \$75,000.

Baltimore

BALTIMORE, April 3.

The Maryland Drydocks Co., Baltimore, has been organized with a capital of \$2,000,000 to take over the shipbuilding plant of the Globe Shipbuilding & Dry Dock Co., on the Patapsco River, recently acquired from the receiver for \$1,050,000. The company will resume work at once. John A. Spilman, former head of the Globe company, has been elected president of the new corporation, and George E. Probest is secretary and treasurer, a position previously held with the old company.

The Rennous-Kleinle Division of the Pittsburgh Plate Glass Co., 3221 Frederick Avenue, Baltimore, has revised plans under way for a new four-story and basement plant, 75 x 205 ft.

The Merchants' Association, Snow Hill, Md., has tentative plans under consideration for a new cold storage and refrigerating plant.

A vocational department will be installed in the new central high school to be erected at Hagerstown, Md., for which a site is now being selected.

The Black-Roy Quemahoning Coal Co., Frostburg, Md., formerly the Triangle Coal Co., is planning for the installation of electrical and other machinery at its properties. James Dining is superintendent in charge.

The Interstate Concrete Co., Charlotte, N. C., recently organized, will commence the immediate erection of a new plant at Lilesville, N. C., for the manufacture of concrete products. A. R. Long is president and general manager.

M. A. Deegan, East Henrietta Street, Charleston, S. C., is planning for the establishment of a factory to manufacture cement roofing tile, and has arranged a list of machinery requirements.

The Southern Maryland Co-Operative Creamery Association, Waldorf, Md., has preliminary plans under way for a new ice-making plant.

The Standard Oil Co., Pratt and Commercial streets, Baltimore, has acquired property at the head of the east branch of the Wicomico River, Salisbury, Md., as a site for a new distributing plant. Steel tanks and auxiliary equipment will be installed at an early date.

The Moncrief Furnace Co., 139 South Pryor Street, Atlanta, Ga., will build its new plant by day labor, consisting of three one-story buildings, two of which will be 50 x 100 ft., and the other, 30 x 40 ft., equipped for foundry and other service. S. P. Moncrief is head.

Fire, March 24, destroyed a portion of the sawmill, with machinery, and other departments at the lumber plant of J. N. Bray & Co., Valdosta, Ga., with loss estimated at about \$75,000.

The International Harvester Co. of America, Atlanta, Ga., with headquarters at 606 South Michigan Avenue, Chicago, has acquired a local site for new branch works for its tractor department, estimated to cost \$100,000. It is planned to have the building ready for occupancy in June.

A vocational department will be installed in the two-story and basement high school, 64 x 150 ft., to be constructed at Leesburg, Va., estimated to cost about \$90,000.

The Lynchburg Traction & Light Co., Lynchburg, Va., is planning for an addition to its steam-operated electric power plant on Blackwater Creek. John W. Hancock is manager.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until April 18 for one motor-driven coil tapping machine, one motor-driven coil winding machine and one magnet wire tension device for the Mare Island Navy Yard; and until April 25 for two electric armature baking ovens for the Puget Sound yard.

The Atlantic Iron Works, Water Street, Norfolk, Va., is preparing plans for rebuilding the portion of its works on Southampton Street recently destroyed by fire. It is estimated to cost approximately \$150,000, including equipment. F. H. Masl is president.

Hackney Brothers, Wilson, N. C., manufacturers of commercial bodies for automobiles, have awarded contract to the Wilkins & Wilkins Co., Wilson, for a new one-story plant, 80 x 300 ft. J. T. Hackney is general manager. The structure will replace works recently destroyed by fire with loss of about \$110,000.

The City Council, Harrisonburg, Va., is perfecting plans for a new municipal electric power plant to cost about \$60,000.

Vocational departments will be installed in the new high schools to be erected at Atlanta, Ga., including a three-story senior high school for boys, Piedmont Park, to cost \$750,000; three junior high schools to cost \$600,000, and two senior high schools to cost \$200,000.

The Hopewell Ice & Cold Storage Co., Hopewell, Va., is

arranging for the erection of a new ice-manufacturing plant, electrically operated, with first unit 35 x 105 ft. Additional units will be erected later. W. C. Ellis is general manager.

Cleveland

CLEVELAND, April 3.

The volume of machinery sales during March showed a fair gain over any recent month and with some machine tool manufacturers it was by far the best month in over a year. However, some business that was expected to be placed is still hanging fire and this may help to swell the total of April sales. During the past week there were no orders as large as some that came out the previous week but business in small lots of tools held up well. The only railroad buying reported was the purchase of two machines by the New York Central, consisting of a 36-ft. planer and a 36-in. side-head boring mill. Locally several used machines were bought by the Klell Automobile Radiator & Mfg. Co.

The only new inquiries of any size came from the Youngstown, Ohio, Board of Education, which issued a list of about 40 machines, largely wood-working, and another list calling for a large amount of miscellaneous small shop equipment. The Chandler Motor Car Co., Cleveland, is inquiring for four polishing lathes.

The Youngstown list follows:

Six 12-in. x 5-ft. semi-quick change geared head apron control lathes.

Three 13-in. x 5-ft. lathes of the same type.

One 16-in x 6-ft. selected head type engine lathe.

One universal open side shaper and planer.

One 21-in. or 22-in. drill press.

One 1-ton portable crane.

One motor-driven hack saw.

One universal milling machine.

One wet and dry grinder.

One 3-ton arbor press on pedestal.

The wood-working machinery includes the following:

Eleven 12-in. motor-head speed lathes.

One 16-in. pattern maker's lathe.

One 30-in. band sawing machine.

Two oil stone grinders.

One 16-in. disk sanders.

One 24-in. cabinet planer.

One belt sanding machine.

One universal single end tenoner.

One vertical hollow chisel mortiser.

One swing cut-off-saw end table.

One circular rip saw.

One universal saw bench.

Two 6-in. hand planers and jointers.

One 16-in. hand planer and jointer.

Twist drill manufacturers report a fair gain in orders but the market is weak and prices are so irregular that regular quotations have almost disappeared. Sales in some cases have been made to jobbers at 70 and 5 per cent off list for carbon drills and 50 and 10 per cent off list for high speed drills. Some jobbers have made price reductions based on the above cost prices and are quoting carbon drills at 70 to 70 and 2½ per cent off list and high speed drills at 50 per cent off list.

Manufacturers of screw machine products in the Central West report a large increase in orders and a tendency to stiffen somewhat on prices which have been very low. A Cleveland manufacturer has taken orders for several million special parts for radio telephone equipment. The demand for cap and set screws has also improved.

The Brown Hoisting Machinery Co., Cleveland, has acquired a 10-acre site in Elyria, Ohio, with the view of future expansion. It has no room for further expansion at the Cleveland plant and now owns and operates a foundry at Elyria, Ohio, under the name of the Elyria Foundry Co. The company has no intention of erecting any factory buildings on its new site in the near future.

The Lewis Mfg. Co., Minerva, Ohio, has completed and is placing in operation a new plant for the manufacture of electric switches. It includes a two-story main building, 62 x 162 ft., a cleaning and enameling room, engine and boiler room. Punch presses, electric welding machinery and other equipment has been installed. The company was formed last year with a capital stock of \$500,000. J. C. Lewis is president and W. H. Gardner, secretary.

The Ewing Bolt & Screw Co., Detroit, organized about a year ago by Cleveland men, has acquired the plant of the Detroit Machine Co. Detroit. Myles E. Ewing, president, and J. A. Hale, secretary-treasurer of the Ewing Bolt & Screw Co., have been made president and secretary-treasurer respectively, of the Detroit Machine Co. In addition to these, the directors include Hal H. Smith, Frank W. Blair, Arthur T. Waterfall, David W. Fell and A. M. Marion, Detroit, and H. J. Douglas and Davis L. Rockwell, Cleveland.

Detroit

DETROIT, April 3.

The University of Michigan, Ann Arbor, Mich., will soon call for bids for a four-story and basement engineering and mechanical shop and laboratory, 180 x 225 ft. Smith, Hinchman & Grylls, Washington Arcade Building, Detroit, are architects. S. W. Smith, University Hall Building, Ann Arbor, is secretary.

The Ford Motor Co., Detroit, is considering plans for the erection of a new plant at Adrian, Mich., for the manufacture of automobile parts.

The Detroit Edison Co., Detroit, has plans under way for a one-story addition to its power plant on Washtenaw Avenue, to form a complete new electric generating unit. It will cost in excess of \$600,000. Gardner S. Williams, Cornwell Building, Detroit, is engineer. Alexander Dow is president.

The Lamb Co., 1938 Franklin Street, Detroit, is planning for the installation of a number of small screw machines, punch presses and other equipment at its machine works.

Arthur R. Sawyer and V. H. Church have acquired the interest of C. T. Parker in the Elan Engine Co., Lansing, Mich., manufacturer of engines and parts, and in the future will be prominently identified with the company. Tentative plans are under consideration for extensions and improvements in the plant.

A vocational department will be installed in the two-story and basement high school addition to be erected at Grand Rapids, Mich., estimated to cost about \$200,000, bids for which will be called early in May. Robinson & Campau, Michigan Trust Building, are architects; Byron Parks & Son, Michigan Trust Building, are mechanical engineers.

Cincinnati

CINCINNATI, April 3.

No marked change is noted in the machine-tool industry, orders still being light. A demand, however, has sprung up for small tools for manufacturing radio apparatus and local dealers report fair orders already placed. On heavier machines, scattered orders are still the rule, and while manufacturers see a much improved tone to the inquiries, business placed has not yet reached proportions to indicate clearly that the industry has definitely turned the corner. Used tools continue in fair activity. The Wheeling Steel Corporation purchased several used tools in this market for its Portsmouth plant. The Maxwell Motor Corporation, which operates a body-building plant at Dayton, Ohio, is inquiring for a number of wood-working machines, but with this exception inquiries are confined almost entirely to single tools. Manufacturers of farming implements report business slightly better, while builders of road making machinery in this district are operating their plants to capacity.

The Crosley Mfg. Co., Cincinnati, manufacturer of radio equipment, has purchased the former plant of the Greaves-Klusman Machine Tool Co., at Cook and Alfred streets, and will equip it for the manufacture of wireless machines. The factory contains 25,000 sq. ft. of floor space, and when in operation will give employment to over 400. The American Automobile Accessories Co., a subsidiary of the Crosley company, will operate the plant. Powell Crosley, Jr., is president.

The Donaldson Lithographing Co., Newport, Ky., has plans prepared for the erection of a five-story addition to its plant, for which bids will be received until April 12 at the offices of Harry Hake, Cincinnati.

The City Ice Supply & Coal Co., Columbus, Ohio, has purchased property in the southwestern part of the city and plans the erection of an electrically equipped ice plant, the machinery to cost approximately \$60,000. Edward Prior, Sr., is president.

The Logan Foundry & Machine Co., Logan, Ohio, has been incorporated with a capitalization of \$75,000 and will enlarge its plant preparatory to engaging in the manufacture of oil field supplies. The company formerly operated as a partnership. M. V. Good is general manager.

The London Motor Plow Co., which recently moved from London, Ohio, to Springfield, has leased quarters in the Shuey Building and is making rapid progress in equipping its plant to produce tractor plows. It is in receipt of inquiries from the Mexican Government for a large number of plows. E. H. Daniel is general manager.

The Sterling Stove Co., Portsmouth, Ohio, has been incorporated with a capitalization of \$100,000 to manufacture gas stoves. It has taken an option on a tract of land on Chillicothe Street, and it is understood will shortly let a contract for the erection of a plant. B. W. Hopkins and Henry Scott are the principal incorporators.

The William Hall Electric Co., Dayton, Ohio, has purchased property on Jefferson Street, between Second and Third streets, and plans the erection of a six-story fireproof

building, work on which will, however, not start until next spring.

The Globe Iron Co., Jackson, Ohio, has let contract for the installation of a blowing engine of the class A type to the Weimar Machine Works Co., Lebanon, Pa. This will give the Globe company three engines of the same type.

Milwaukee

MILWAUKEE, April 3.

A perceptible increase in inquiry and better sales in the last 10 days of March carried the machine-tool trade into the new month with brighter prospects than at any time since last October. While March business probably in most cases was not in excess of January or February, there is reason to believe that many prospective buyers who put out inquiries in the past week will close on these within a short time. No large lots are involved, the business running in one or two tools. The call for milling machines, which for a long time has been suffering from a lack of demand, is more active.

The Simms Foundry Corporation, Racine, Wis., has filed articles of incorporation. The capital stock consists of \$200,000 preferred stock and 3000 common shares without par value. The new concern is in effect a consolidation of the Simms Foundry Co. with the Racine Furnace & Foundry Co., which has been acquired by Horace H. Simms and associates. Incorporators of the new corporation are Horace H. Simms, John H. Osborne and R. L. Williams, all of Racine. No further details of the consolidation have been made public.

The Delavan, Wis., Board of Public Works is taking bids until April 7 for the enlargement of the municipal waterworks system. It includes an addition to the pumping station and the installation of a new pumping unit with a capacity of 500 gal. per min., with motor drive. K. L. Hollister is city clerk.

The Venus Arch Support Co., Chicago, has been reorganized as the Venus Foot Appliance Co. of Racine, a Wisconsin corporation having an authorized capitalization of \$200,000. The plant is being moved from Chicago to Racine, where it will occupy a part of the Terminal Building at Main Street bridge. The incorporators are Ben E. Anderson, Joseph Schroeder and William C. Hood, all of Racine, who will become the principal officers.

The Simplicity Engine & Mfg. Co., Port Washington, Wis., has been incorporated with an initial capitalization of \$5,000 to manufacture tools, mechanical appliances and devices, gas engines, etc. It has been for some time conducting a machine shop, specializing in manufacturing a combination boring and reaming tool for automotive shops and garage repair shops. The incorporators are Fred R. Schelner and L. N. Sheaffer, Port Washington, and Louis N. Blron, attorney, Mitchell Building, Milwaukee.

The Badger Cabinet Co., Plymouth, Wis., which sustained a heavy loss by fire Jan. 1, has plans for a new factory, brick and mill construction, to cost about \$85,000. Practically all of the machinery and equipment requires replacement.

J. H. Saris, 412 Broad Street, Beloit, Wis., Ford dealer, will build a new two-story and basement garage, sales and service building, 100 x 130 ft., estimated to cost \$65,000. The architect is J. T. Hetherington, 33 South Dearborn Street, Chicago.

The White Rapids Paper Co., Appleton, Wis., has been organized with \$200,000 capital by Appleton business men headed by T. Eugene Orbison, consulting engineer and J. C. Lymer, who intend to develop a water power site on the Wolf River at White Rapids and erect a paper and pulp mill. Definite plans have not yet been completed.

The Board of Education, Eagle River, Wis., closes bids April 17 for the construction of a new high school with complete manual training department, designed by Parkinson & Dockendorff, architects, La Crosse, Wis. It will be two stories and basement, 110 x 156 ft., and is estimated to cost \$150,000. Charles H. Adams is secretary of the board.

The Wickmann Mfg. Co., Milwaukee, has been incorporated with a capital stock of \$25,000 to manufacture electrical appliances and devices. The incorporators are Jacob H. Wickmann, 404 Logan Avenue; E. Wickmann, and H. L. Hansen. A shop will be equipped within a short time.

The Business Men's Club, Waupun, Wis., has appointed Bragg Stoddart chairman of a special committee to have charge of negotiations with L. C. Clute of Oshkosh, Wis., and L. J. Hovorak, Minneapolis, Minn., who are seeking a site for a proposed motor truck manufacturing industry.

Smith Brothers & Kuehl, Merrill, Wis., will build a three-

story addition, 30 x 100 ft., and a new warehouse and office building for its wood-working business. It is in the market for saws, shapers, motors, etc.

The Charles W. Fish Lumber Co., Elcho, Wis., contemplates the early reconstruction of its sawmill at Antigo, Wis., recently destroyed by fire. The investment is expected to be about \$75,000. The machinery and equipment will be new.

The Sheboygan, Wis., Board of Education has let the general contract to the Ludolph M. Hansen Co., Green Bay, Wis., for the construction of the second, or industrial training unit, of the new \$1,500,000 high school. The same contractor is erecting the first unit.

The Pacific Coast

SAN FRANCISCO, March 28.

The Smoot-Holman Co., Los Angeles, a reorganization of the American Enameling & Stamping Works, has acquired about 5 acres at Inglewood, Cal., for the erection of a new plant to manufacture stamped metal and other metal products.

The Fresno Tire & Rubber Co., Fresno, Cal., will soon break ground for a new plant at Selma, Cal., with main building, three-stories, 60 x 250 ft., and other smaller structures. John S. Bates, Rowell Building, Fresno, is engineer.

Frank E. and J. D. Woodward, Palo Alto, Cal., have acquired property at Hamilton and High street, and contemplate the erection of a new ice-manufacturing and cold storage plant to cost about \$75,000, including equipment.

The Hurley Machine Co., West Twenty-second Street and South Fifty-fourth Avenue, Chicago, manufacturer of electrically operated washing and ironing machines, has negotiations under way for property at San Francisco, to be used as a site for a Pacific Coast branch plant, estimated to cost \$1,000,000.

The W. H. Cain Gas Radiator Co., Moneta Avenue, Los Angeles, has had plans prepared for a new two-story factory, 50 x 140 ft., at 5211-17 Moneta Avenue. W. H. Cain is president.

The Southern California Metal & Leather Co., 2300 East Eleventh Street, Los Angeles, manufacturer of metal products, etc., is considering plans for rebuilding the portion of its works destroyed by fire March 21, with loss estimated at \$150,000, including machinery.

The Great Western Power Co., 14 Sansom Street, San Francisco, has completed arrangements for the purchase of the property of the Universal Electric & Gas Co., 469 Sutter Street, operating at San Francisco and vicinity, for \$2,250,000. The new owner will make extensions in the power plants and system and will soon break ground for a new power house at El Cerrito, Cal., to cost \$125,000.

A vocational group of buildings will be erected at the new Horace Mann School, San Francisco, estimated to cost about \$400,000. John Reid, Jr., First National Bank Building, is architect.

The Bethlehem Shipbuilding Corporation, San Francisco, is arranging for extensions in its manufacturing facilities for the manufacture of Diesel engines and parts at its San Francisco, Oakland and Los Angeles plants, to include the installation of additional machinery. The work is estimated to cost close to \$1,000,000. J. J. Tynan is general manager.

The San Joaquin Light & Power Corporation, Fresno, Cal., has been granted permission to utilize waters from the North and West Forks of the Kings River for a series of hydroelectric generating plants estimated to cost \$50,000,000, with total capacities approximating 350,000 hp. Work on the initial plant will commence soon.

The Peninsular Railway Co., Shelton, Wash., has plans under way for a new machine and repair shop to cost about \$100,000, including machinery.

The Grays Harbor Electric Railway & Power Co., Hoquiam, Wash., operated by Sanderson & Porter, 52 William Street, New York, engineers, is contemplating the erection of a new power plant, with line extensions, estimated to cost \$250,000, including machinery.

Electric traveling cranes and other freight-handling and mechanical equipment will be installed on the new pier to be constructed at Vancouver, B. C., by the Canadian Pacific Railroad Co., Vancouver, of steel and concrete, double-deck, 750 ft. long, and estimated to cost \$1,500,000.

The Tacoma Fir Lumber Co., Tacoma, Wash., is considering plans for rebuilding the portion of its mill destroyed by fire March 23, with loss estimated at \$50,000, including machinery.

Indiana

INDIANAPOLIS, April 3.

The Bucyrus Co., Decker Road, Evansville, Ind., manufacturer of steam shovels, dredging equipment, etc., will soon break ground for a one-story addition, 120 x 240 ft., estimated to cost \$50,000. Headquarters of the company are at South Milwaukee, Wis.

A vocational department will be installed in the new one-story and basement high school to be erected at Yorktown, Ind., estimated to cost about \$75,000. Houck & Smenner, 1234½ West Main Street, Muncie, Ind., are architects.

Fire, March 24, destroyed two buildings at the works of the Rice Hub & Rim Co., English, Ind., with loss estimated at about \$40,000.

The Indiana Hydroelectric Power Co., Indianapolis, affiliated with the Interstate Public Service Co., of the same city, has awarded a general contract to the Mansfield Engineering Co., Indianapolis, for the construction of a dam and foundation for power plant on the Tippecanoe River, near Monticello, Ind., estimated to cost \$500,000. The work is exclusive of power house superstructure and hydroelectric machinery, bids for which will be asked in the near future. The complete plant will have an initial output of about 9000 hp. and is estimated to cost in excess of \$1,000,000. It will be the first of a series of hydroelectric generating stations in this section. Harry Reid is vice-president and general manager.

A vocational department will be installed in the two-story and basement high school, 138 x 140 ft., to be erected at Bluffton, Ind., estimated to cost \$160,000.

The International Rubber Co. of America, Anderson, Ind., recently organized under Delaware laws with capital of \$200,000, has acquired the works of the Quality Tire & Rubber Co. from the receiver for \$200,000. Alterations will be made and the plant placed in operation at an early date for the manufacture of automobile tires and other rubber products. The company is reported to be negotiating for the purchase of the Elyria, Ohio, plant of the Quality company, which has also been placed on the market. J. D. Wiggins, formerly connected with the American Can Co., is president and general manager; M. D. Ganger, vice-president and superintendent, and A. L. McKee, secretary and treasurer.

A vocational department will be installed in the two-story senior and junior high school, 160 x 182 ft., to be erected at Plymouth, Ind., to cost about \$200,000. Ernest W. Young, South Bend, Ind., is architect.

The Penglass Engineering Co., Evansville, Ind., recently organized, will purchase digging, conveying, loading and other machinery for a new gravel plant at Grayville, Ill. B. S. Alnutt, cashier of the National City Bank, Evansville, is secretary and treasurer of the new company.

A vocational department will be installed in the new high school to be erected at Milford, Ind., estimated to cost about \$80,000. Fisher Brothers, Fisher Building, Pontiac, Mich., are architects and engineers.

The Gulf States

BIRMINGHAM, April 3.

The Petroleum Iron Works Co., Sharon, Pa., is closing negotiations for the purchase of the plant and equipment of the Beaumont Shipbuilding & Dry Dock Co., Beaumont, Tex., for \$300,000. It will be purchased by the Petroleum Land Co., a subsidiary organization, and used by the parent company as a Southern plant for the manufacture of oil tanks, tank cars, refining machinery, etc. Plans are being considered for the establishment of steel fabricating works. The entire site totals 71 acres.

The Dallas Power & Light Co., Dallas, Tex., is completing plans for a new central generating plant estimated to cost about \$1,500,000, including machinery. It will have an initial capacity of 15,000 kw. C. E. Calder is president.

A vocational department will be installed in the new high school, 120 x 170 ft., to be erected at Mexia, Tex., estimated to cost about \$160,000. DeWitt & Lemmon, 806 Southwestern Life Building, Dallas, Tex., are architects.

J. P. King, Arlington, Tex., is organizing a company to build an ice-manufacturing plant estimated to cost \$50,000. Plans are being prepared.

The Standard Chemical & Oil Co., Troy, Ala., is considering plans for rebuilding the portion of its No. 1 plant, destroyed by fire March 22 with loss estimated at \$75,000, including machinery.

The Gadsden Clay Products Co., Gadsden, Ala., is planning for the installation of a new steam-operated power plant at its works. Gordon Hood is secretary and treasurer.

A vocational department will be installed in the two-story high school to be erected by the Sulphur Springs Independent District School Board, Sulphur Springs, Tex., estimated to

cost \$100,000. Barglebaugh & Whitson, 1008 Southwestern Life Building, Dallas, Tex., are architects.

The State Board of Control, Austin, Tex., is taking bids until April 18 for 600,000 steel or metal number automobile license plates, with option of purchasing an additional 100,000 plates.

The Brockman Packing Co., Pensacola, Fla., is arranging for the erection of a new cold storage and refrigerating plant.

A vocational department will be installed in the new high school to be erected by the Claude Independent School District, Claude, Tex., plans for which are being prepared by Guy A. Carlander, Amarillo, Tex., architect.

The Muscle Shoals Rock Asphalt Co., Russellville, Ala., recently organized with a capital of \$1,000,000, has plans under way for the erection of a plant on property lately acquired. It will be equipped with grinding, conveying and other machinery for an initial capacity of 1000 tons per day. C. E. Dexter, Louisville, Ky., is president; C. J. Stillers is construction engineer.

The board of directors, Texas Presbyterian College for Women, Milford, Tex., is planning to rebuild the power house destroyed by fire, March 22.

The Common Council, Quincy, Fla., is contemplating the erection of a municipal hydroelectric power plant estimated to cost about \$175,000. J. P. Smith, city clerk, is in charge.

A vocational department will be installed in the new junior high school to be erected at Waco, Tex., estimated to cost \$150,000. H. B. Cobb is superintendent of the board.

The Freeport Sulphur Co., Freeport, Tex., has leased the property of the Texas Co., Hoskins Mound, Brazoria, Tex., for a sulphur producing plant, estimated to cost in excess of \$500,000, including machinery. Grinding, mechanical conveying and other equipment will be purchased.

The Common Council, Gainesville, Fla., will soon commence the construction of a new municipal electric power plant, estimated to cost \$40,000.

Bonds have been voted by citizens of Timpeon, Tex., for the erection of a municipal electric lighting plant. Work will be placed under way at once.

The Summers-Cooper Co., Opelika, Ala., is planning for the purchase of ice and refrigerating machinery at its local plant.

A vocational department will be installed in the new high school, 125 x 170 ft., to be erected at Ranger, Tex., estimated to cost \$120,000. John Tulloch, Sherman, Tex., is architect.

The Central South

St. Louis, April 3.

The Tennessee Mill & Mine Supply Co., Knoxville, Tenn., has leased a four-story building on State Street, 43 x 140 ft., for a new plant to manufacture mining equipment and supplies. Machinery of heavy type will be installed. G. H. Manning is president.

The Moffet Coal Co., St. Louis, is planning for the installation of electrical and other machinery at its properties at Eoline, Mo., recently acquired. Approximately \$100,000 will be expended in machinery and development. W. O. Lewis, assistant general manager, is in charge.

The Southern Refrigerating Co., Umka Bank Building, Johnson City, Tenn., is having plans prepared for a new ice and cold storage plant estimated to cost about \$200,000, including machinery.

The Emmart Packing Co., Louisville, has plans under way for a new ice-manufacturing and refrigerating plant. Henschien & McLaren, 1637 Prairie Avenue, Chicago, are architects and engineers.

The Schoellborn-Albrecht Machine Co., 721 North Second Street, St. Louis, is making inquiries for a quantity of second-hand tools for machine shop service.

The Automatic Water Pump Mfg. Co., 236 East High Street, Jefferson City, Mo., has plans under way for the erection of six one-story buildings for the manufacture of pumping machinery and parts, estimated to cost \$100,000. B. F. Schuetz is president.

The Croft-Riley Co., Weleetka, Okla., recently organized with a capital of \$100,000, is planning for the early erection of a new one-story machine shop for the manufacture of oil-well machinery and parts. E. L. Croft and H. E. Riley, both of Fort Smith, Ark., head the company.

The Paintsville Oil & Refining Co., Paintsville, Ky., will commence the immediate erection of a new oil topping plant near Paintsville, including steel tanks and other machinery, estimated to cost about \$75,000. Ralph Stafford heads the company. M. B. Westcott is engineer.

The Canton Ice Co., Canton, Miss., is planning to rebuild the portion of its ice-manufacturing plant recently destroyed

by fire with loss estimated at \$100,000, including equipment.

The City Council, Vicksburg, Miss., will install new equipment at the power house at its waterworks.

The Johnson Automobile Co., 3667 Olive Street, St. Louis, is having plans drawn for a new two-story service and repair building, 50 x 52 ft., estimated to cost about \$50,000, including equipment. W. P. McMahon, Title Guaranty Building, is architect.

A vocational department will be installed in the new three-story high school to be erected at Covington, Okla. R. W. Shaw, Beck Building, Enid, Okla., is architect.

The Edward Hines Yellow Pine Trustees, Lumberton, Miss., have acquired the local municipal electric power plant and will operate it as a private enterprise. Plans are under way for extensions and improvements. F. W. Pettibone is general manager.

A vocational department will be installed in the two-story and basement junior high school, 135 x 195 ft., to be erected at Coffeyville, Kan., estimated to cost \$250,000, bids for which are being received until April 18. A. T. Simmons, Bloomington, Ill., is architect.

Four concrete floating docks, provided with electric traveling cranes, will be constructed at the new barge line terminals at Memphis, Tenn., the entire project, with steel sheds and freight-handling machinery, being estimated to cost about \$500,000. The project will be carried out jointly by the local Board of Works and the Federal Government. The general contract has been let to R. W. E. Thompson, Earle, Ark.

Canada

TORONTO, April 3.

The demand for machine tools continues on about the same level as that of the past two or three weeks. Inquiries are coming forward freely and orders are being received in satisfactory numbers. Both dealers and manufacturers are looking forward to a steady improvement from now on and new factories and additions are expected to have a stimulating effect on the market. Orders recently received by manufacturers have made it necessary for many to increase their output and as a result activities range from 50 to 75 per cent, with a few operating to capacity. As compared with business of a year ago, dealers' sales have increased from 10 to 25 per cent. In the Montreal district, where business has been exceptionally quiet for the past year and a half, a general brightening up in conditions is noticeable and the demand for many lines of equipment is steadily improving. Increased activity is noted for small tools and users have apparently passed the hand-to-mouth buying stage with a few placing good sized orders. While one Canadian concern announced a reduction of 10 per cent on its products two weeks ago, no further reductions have been made and American and British made equipment are holding to old prices.

The Universal Wrench Co., Windsor, Ont., plans to move its factory to Amherstburg, Ont., and will install additional equipment.

Tudhope & Ludgate, Parry Sound, Ont., are in the market for equipment for a sawmill to be erected at Deer Lake, Ont.

The United Auto Supplies, Ltd., Montreal, is in the market for machine tools and lathes for general repair work.

The Durant Motors of Canada, Ltd., 1011 Royal Bank Building, Toronto, is preparing to erect an 80 x 600 ft. addition to its plant at Leaside, Ont.

The Fletcher Lumber Co., 1451 Dougall Avenue, Windsor, Ont., will erect a planing mill and is receiving prices on equipment.

A cold storage plant is to be erected at Welland, Ont., by the St. Thomas Packing Co. It will be available for customs storage as well as the company's own requirements and will cost \$50,000.

Highway Crossings, Ltd., manufacturer of steel crossings for railroads, will locate at Welland, Ont., where a site, 100 x 500 ft., has been secured in Maple Leaf Park.

The Provincial Paper Mills, Ltd., Port Arthur, Ont., has awarded contracts for a new mill to cost \$1,500,000.

Frank D. Zell, Philadelphia, has asked for the appointment of a receiver for the Harley Co., Springfield, Mass, forgings and castings. The property a short time ago was taken over by Philadelphia interests from the Hendee Mfg. Co., Springfield, motorcycles, at a price believed to be in excess of \$1,000,000. At the time of the transfer of the property the Hendee Mfg. Co. took a mortgage of \$725,000, and the move by Mr. Zell possibly may be an attempt to save the plant from foreclosure. Plans are made to raise additional working capital in Boston.

IRON AND STRUCTURAL STOCKS

Fresh Vitality Imparted to the Upward Movement Last Week

Fresh vitality was imparted to the upward movement of security values the past week, based partly on pure speculative and partly on real investment buying. Increased bookings and rising earnings in the steel, motor and equipment industries and by the carriers, together with the general business improvement in the West and South and a further easing in the money situation, are the fundamental factors on which both classes of securities buying are based. The quick sale of something like \$9,000,000 of steel companies' bonds last week expresses the confidence of investment in that industry. In connection with the advance in security values so far this year, it is interesting to note that less than 630 holders of United States Steel common decided to sell their stock during the three months ended with March 31, last.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalmers ..	43 3/4 - 47 1/4	Lima Loco.	106 - 112
Allis-Chal. pf. ..	91 1/4 - 92 1/4	Lima Loco. pf.	106 - 110 1/4
Am. B. S. & Fdy. 57 1/4 - 59 1/4		Midvale Steel ...	32 1/4 - 34 1/4
Am. B. S. & F. pf. ..	-102	Nat.-Acme	14 1/4 - 16
Am. Can.	44 1/4 - 48 1/4	Nat. En. & St. ...	33 1/4 - 35 1/4
Am. Can. pf.	101 1/2 - 101 1/4	Nat. En. & St. pf. ..	- 85
Am. Car & Fdy. 152 - 156 1/4		N. Y. Air Brake. 63 1/4 - 68	
Am. Car & F. pf. 116 1/2 - 118 1/4		Nova Scotia Steel 24 - 25 1/4	
Am. Loco.	107 1/2 - 111 1/4	Otis Elevator ...	136 - 142 1/4
Am. Loco. pf.	116 - 117	Otis Steel	11 1/4 - 12 1/4
Am. Radiator ...	85 - 87 1/4	Otis Steel pf.	53 1/2 - 55 1/4
Am. Steel Fd.	35 - 37 1/4	Pressed Steel ...	69 1/2 - 75
Am. Steel Fd. pf. 95 1/4 - 96		Pressed Steel pf. ..	- 92
Bald. Loco.	105 1/4 - 112 1/4	Ry. Steel Spring. 96 1/4 - 98 1/4	
Bald. Loco. pf.	-108 1/2	Replogie Steel ...	30 1/4 - 32 1/4
Beth. Steel	63 1/4 - 70	Republic	50 1/2 - 53 1/4
Beth. Steel, Cl. B 69 1/4 - 75 1/4		Republic pf.	77 - 78 1/4
Beth. St. 8% pf. 109 1/4 - 113		Sloss	39 1/4 - 41 1/4
Brit. Em. S. 1 pf. 62 - 63		Sloss pf.	- 69
Brit. Em. S. 2 pf. 19 1/4 - 20		Steel of Can.	64 - 65 1/4
Case Th. Mch. pf. ..	- 77 1/4	Stewart-Warner. 36 1/4 - 38 1/4	
Chic. Pneu. Tool. 68 1/4 - 69 1/4		Superior Steel ...	29 1/4 - 31 1/4
Colo. Fuel	29 - 30 1/4	Transue-Williams 40 - 41	
Crucible Steel ...	55 1/4 - 58	Un. Alloy Steel ...	30 - 31
Crucible Steel pf. 84 1/4 - 85		U. S. Pipe.	31 1/4 - 37
Gen. Electric ...	152 - 157 1/4	U. S. Pipe pf.	65 1/4 - 66 1/4
Gt. No. Ore Cert. 35 1/4 - 37		U. S. Steel.	93 1/4 - 96 1/4
Gulf States Steel 67 1/4 - 72 1/4		U. S. Steel pf.	116 1/4 - 117 1/4
Inland Steel	48 1/4 - 49	Vanadium Steel. 37 1/4 - 39 1/4	
Int. Har.	92 - 97 1/4	Va. I. C. & Coke. 43 - 45 1/4	
Int. Har. pf.	109 - 110 1/4	West. Air Brake. 85 1/4 - 89 1/4	
Lackawanna St. 47 1/2 - 51 1/4		Westhouse Elec. 56 1/4 - 58 1/4	

Canadian General Electric Report

The Canadian General Electric Co., Toronto, Ont., in its financial statement for the year ending December 31, 1921, reports a reduction in profits from the previous year. The electrical equipment industry, in common with practically every other branch of manufacture, experienced a substantial shrinkage of business during the adjustment year, which is reflected in lower earnings and profits. President A. E. Dymont points to the fallacy of the opinion so commonly held that, no matter how unfavorable conditions may be in all other lines of business, the manufacture of electrical apparatus and supplies in Canada must continue extremely profitable. Profits for the year amounted to \$1,707,339, as compared with \$2,213,731 for the previous year. After depreciation and interest on borrowed capital, net profits amount to \$706,092 as against \$1,356,689. After dividends amounting to \$927,038 there is a deficit of \$220,946, which is made up from the undivided profits carried forward from the previous year's account of \$778,672.

Steel Co. of Canada Report

Profits of the Steel Co. of Canada, Hamilton, Ont., for the year ending December 31, 1921, were less than half those of the previous year, thus reflecting as the directors report, one of the most difficult years in the history of the steel industry. Total profits from operations were \$1,778,661 as compared with \$3,924,014 in 1920. Added to this, however, is \$374,704 which represented interest from securities and investments and which brought the total income to \$2,153,366. Reserves including bonds, sinking fund, \$212,803 and depreciation \$621,800 amounted to \$834,603 and interest on bonds absorbed, \$501,470. The sum of \$1,259,741 was distributed in dividends, leaving a deficit for the year of \$442,448. This amount was subtracted from the balance brought forward from the previous year of \$8,740,965, leaving \$8,298,516 to carry forward into the current year.

Regarding general operations for the past year, the president, Robert Hobson, says: "The year just past has been the most strenuous one in the history of the iron and steel business the world over. There was very little

business offering and all relations between cost of production and selling prices was lost sight of. Heads of the various steel companies in the United States repeatedly stated in public that business was being done at a loss, and the result of the year's operations as disclosed in various annual reports which have recently been issued, confirm the statements above referred to. The competition for business with which we were faced during the whole year was the most serious we have ever experienced. At no time were we able to operate our plants to anything like capacity. It was only by exercising the most rigid economy that we were able to obtain the results shown in our balance sheet. The salaries and wages of all officials and employees were cut during the year. We are still being forced to pay the excessive high freight rates, both on our raw materials and manufactured products. There is no doubt but that high freight rates are retarding the return of business to a normal condition."

United Alloy Loss Last Year

The income and expense statement of the United Alloy Steel Corporation, Canton, Ohio, and subsidiaries for the year ended Dec. 31, 1921, follows:

PROFITS			
Manufacturing	\$157,411.28		
Income—stocks and bonds.....	103,217.09		
Interest—Net	98,995.88		
Miscellaneous	247,901.19	\$607,525.44	
CHARGES			
Reorganization—expense	\$148,616.94		
Taxes—real, personal and corporate	288,683.95		
Miscellaneous	237,747.59	675,048.48	
Operating loss before inventory adjustments and plant depreciation		\$67,523.04	
Adjustment of inventories.....	\$1,404,635.76		
Depreciation—plant and equipment	1,274,920.04	2,679,555.80	
Net charge to surplus.....		\$2,747,078.84	
CAPITAL SURPLUS			
Surplus Dec. 31, 1920.....		\$28,140,540.90	
DEDUCTIONS			
Net loss for the year ended Dec. 31, 1921, as shown by statement of income and expense.....		\$2,747,078.84	
Dividends paid and provided for—preferred	225,750.00		
		\$2,972,828.84	
Less: Other surplus adjustments—net	37,670.10		
Net deductions.....		2,935,158.74	
Capital surplus Dec. 31, 1921.....		\$25,205,382.16	

International Harvester Profits

The International Harvester Co.'s annual report for 1921 shows a net profit for the year of \$4,149,918.80, compared with \$16,655,300 for 1920, and total sales of \$121,215,000, or 54 per cent of the total for the preceding year.

President Harold F. McCormick's message to the stockholders calls last year "the worst in the history of the agricultural implement business," and says the business done in the United States produced no profit, all profits shown having been derived from the company's foreign trade. It says that had a conservative policy of inventory valuation not been adopted at the beginning of the war, the present balance sheet, instead of exhibiting some profit, would have shown a net loss of more than \$20,000,000.

Colorado Fuel & Iron Co. Deficit

The thirteenth annual report of the Colorado Fuel & Iron Co. shows that the deficit last year after all charges amounted to \$2,731,171. The production of finished iron and steel was 226,664 tons, compared with 428,222 in 1920. The report shows the following interesting facts among others:

Gross receipts from sales were \$27,485,938.42, compared with \$51,812,813.14 in 1920, being a decrease of \$24,326,874.72, or 47 per cent.

Operating expenses were \$25,712,432.72, compared with \$46,346,320.57, a decrease of \$20,633,887.85, or 44½ per cent.

Net earnings from operations were \$1,773,505.70, compared with \$5,466,492.57, a decrease of \$3,692,986.87, or 67 per cent.

Income from sources other than operation was \$378,592.35,

making total income \$2,152,098.05, compared with \$5,979,243.72.

Fixed charges of bond interest, real estate sinking funds, general taxes and fire insurance fund amounted to \$2,740,957.68, leaving a deficit of \$588,859.63.

Charges for depreciation and depletion reserves were made at the rates maintained during recent years and amounted to \$1,523,598.70. Reductions in inventory values to replacement costs were \$618,713.29, making final deficit, after all charges, \$2,731,171.62.

Sales of both steel and coal made during the early months of the year, for delivery through the first three quarters of the year, were of such volume as to justify the declaration of the first two quarterly dividends on both common and preferred stock. The last two dividends for the year on preferred were paid out of accumulated surplus.

Shipments of steel during the year decreased from 428,222 tons in 1920 to 226,664 in 1921, the latter being the smallest year's shipments since 1904.

Shipments of coal decreased 35½ per cent, from 4,266,507 tons to 2,770,249 tons.

American Smelting & Refining Company

In the annual report of the American Smelting & Refining Co. President Simon Guggenheim indicates various improvements in the company's position and reports the liquidation of \$12,000,000 of indebtedness to banks without increasing the funded debt or issuing notes or new capital. "The company closed the year free of debt except, of course, its bonds and usual current bills," President Guggenheim said. A metal reserve account of \$5,000,000 was created to take care of inventory depreciation of surplus stocks of metals. Since December 31, 1920, the metal stocks increased in value \$2,000,000 because of improved market prices during the year 1921.

Total income from sales of metals amounted to \$130,810,592.40, a decrease of \$36,117,889.52 compared to 1920. This was mainly accounted for by the small mine production and consequent restricted smelting and refining of copper, zinc, and tin. Proceeds from sales of gold were well up to the 1920 figure. The sales of silver exceeded in value the amount obtained in 1920.

The company paid \$4,168,043.75 in dividends. The net operating income of the smelting and refining plants before providing for bond interest, depreciation, etc., was \$8,180,970.13, a decrease of \$5,108,649.44 compared to 1920. With all deductions made the net income for the year was \$1,591,908.92, a decrease of \$5,082,869.78 compared to 1920.

Industrial Finances

Directors of the Truscon Steel Co., Youngstown, Ohio, have declared a quarterly dividend of one per cent on common stock, payable April 15. The previous quarter the company paid 1½ per cent on its common stock.

LaBelle Iron Works recently sold to a syndicate of bankers headed by Lee Higginson & Co., a new issue of \$4,000,000 first and refunding mortgage 6 per cent gold bonds, due Dec. 15, 1940. This company is a subsidiary of the Wheeling Steel Corporation. Another subsidiary company, the Whitaker-Glessner Co., has sold to the same syndicate \$4,500,000 first mortgage 6 per cent sinking fund gold bonds, due April 1, 1941. These issues are partly to cover expenditures for extensions and improvements at the plant of LaBelle Iron Works, and for a new rod and wire mill and other improvements at the Portsmouth, Ohio, works of Whitaker-Glessner Co.

A special stockholders' meeting is called for April 11 by the Union Twist Drill Co., Athol, Mass., to approve the creation of \$1,500,000 10-year 7 per cent mortgage bonds, proceeds of which will be used to pay off the company's floating indebtedness, which on Dec. 31 last amounted to \$1,768,500. Due chiefly to the shrinkage in inventories and to business conditions, the books at the close of 1921 showed a shrinkage in the surplus of \$2,564,345, that item standing at \$2,126,955. The total quick assets were \$3,161,033 at the close of 1921, while the quick liabilities were \$2,133,337.

After allowing for depreciation, a reduction in inventory values and estimated Federal taxes, the American Brake Shoe & Foundry Co. last year made an operating profit of \$1,329,371, contrasted with a profit of \$2,584,593 for 1920. After interest charges last year, the net income was \$1,326,271, equivalent, after dividends on subsidiary stocks and preferred shares, to \$4.11 a share on the 148,854 outstanding shares of common stock of no par value, as against \$13.08 earned on the same number of shares in 1920. The company closed the year with a surplus of \$46,737, small, to be sure, but nevertheless a surplus. The surplus for 1920 amounted to \$855,941.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	Per Lb.
Refined iron bars, base price	2.38c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.38c.
Hoops, base price	3.28c. to 3.38c.
Bands, base price	2.88c. to 2.98c.
Beams and channels, angles and tees	
3 in. x ¼ in. and larger, base	2.48c.
Channels, angles and tees under 3 in. x	
¼ in., base	2.38c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.40c.
(Smooth finish, 1 to 2½ x ¼ in. and larger) ..	2.60c.
Toe-calk, ½ x ¾ in. and larger	3.20c.
Cold-rolled strip, soft and quarter hard ..	6.25c. to 7.25c.
Open-hearth spring steel	3.50c. to 6c.
Shafting and Screw Stock:	
Rounds	3.35c.
Squares, flats and hex.	3.85c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.48c.
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Sheets

Blue Annealed		Per Lb.
No. 10	3.28c. to 3.53c.	
No. 12	3.33c. to 3.58c.	
No. 14	3.38c. to 3.63c.	
No. 16	3.48c. to 3.73c.	

Box Annealed—Black

	Soft Steel C. R. One Pass Per Lb.	Blued Stove Pipe Sheet. Per Lb.
Nos. 18 to 20	3.55c. to 3.80c.	.....
Nos. 22 and 24	3.60c. to 3.85c.	4.10c.
No. 26	3.65c. to 3.90c.	4.15c.
No. 28	3.75c. to 4.00c.	4.25c.
No. 30	4.00c. to 4.25c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	3.85c. to 4.10c.
No. 16	4.00c. to 4.25c.
Nos. 18 and 20	4.15c. to 4.40c.
Nos. 22 and 24	4.30c. to 4.55c.
No. 26	4.45c. to 4.70c.
No. 27	4.60c. to 4.85c.
No. 28	4.75c. to 5.00c.
No. 30	5.25c. to 5.50c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel		Wrought Iron	
Black	Galv.	Black	Galv.
½ in. Butt... —56	—40	¾ in. Butt... —30	—13
¾ in. Butt... —61	—47	1½ in. Butt... —32	—15
1-3 in. Butt... —63	—49	2 in. Lap... —27	—10
3½-6 in. Lap... —60	—46	2½-6 in. Lap... —30	—15
7-8 in. Lap... —56	—34	7-12 in. Lap... —23	—7
9-12 in. Lap... —55	—33		

Steel Wire

BASE PRICE* ON NO. 9 GAGE AND COARSER		Per Lb.
Bright basic	3.50c. to 3.75c.	
Annealed soft	3.50c. to 3.75c.	
Galvanized annealed	4.25c. to 4.50c.	
Coppered basic	4.00c. to 4.25c.	
Tinned soft Bessemer	5.50c. to 5.75c.	

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	16½c. to 17 c.
High brass wire	17 c. to 17½c.
Brass rod	14½c. to 14¾c.
Brass tube, brazed	26 c. to 27½c.
Brass tube, seamless	18½c. to 19 c.
Copper tube, seamless	20¾c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 19½c. to 20½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		Primes Wasters	
Grade	Grade				
"AAA"	"A"				
Charcoal	Charcoal				
14x20	14x20				
IC.. \$10.00	\$8.50	80 lb..	\$6.05	\$5.80	
IX.. 11.50	10.00	90 lb..	6.15	5.90	
IXX.. 13.00	11.25	100 lb..	6.25	6.00	
IXXX.. 14.25	12.50	IC..	6.40	6.15	
IXXXX.. 16.00	14.00	IX..	7.40	7.15	
		IXX..	8.40	8.15	
		IXXX..	9.40	9.15	
		IXXXX..	10.40	10.15	

Terne Plates

8-lb. coating 14 x 20

100 lb.	\$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits, pig	32c.
Bar	37c. to 42c.

Copper

Lake ingot	15 c.
Electrolytic	14½c.
Casting	14½c.

Spelter and Sheet Zinc

Western spelter	6½c. to 7c.
Sheet zinc, No. 9 base, casks	9½c. open 10c.

Lead and Solder*

American pig lead	5½c. to 6¼c.
Bar lead	6¼c. to 7 c.
Solder, ½ and ½ guaranteed	23c.
No. 1 solder	21c.
Refined solder	17c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c.
Commercial grade, per lb.	35c.
Grade D, per lb.	25c.

Antimony

Asiatic	5½c. to 5¾c.
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Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	25c. to 27c.
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Old Metals

The market is weak and business is very quiet. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	10.75
Copper, heavy wire	9.75
Copper, light and bottoms	8.00
Brass, heavy	5.00
Brass, light	4.50
Heavy machine composition	7.75
No. 1 yellow brass turnings	5.25
No. 1 red brass or composition turnings	6.75
Lead, heavy	3.75
Lead, tea	2.50
Zinc	2.50

